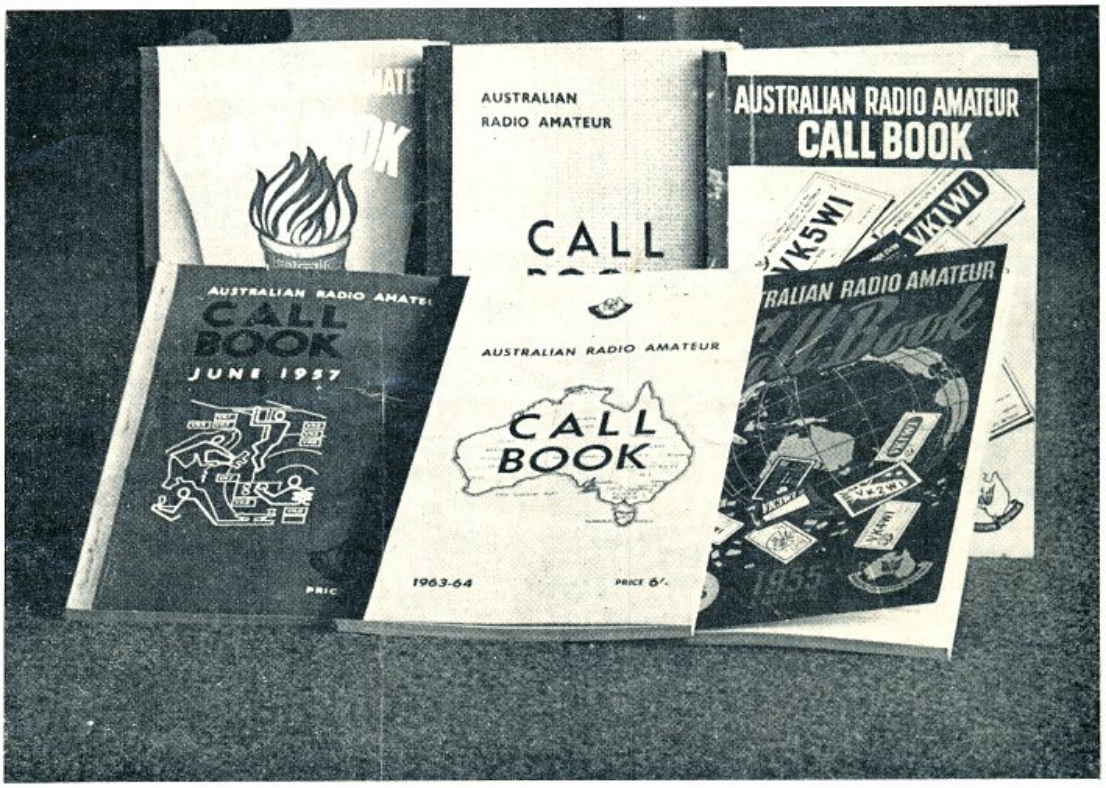
AMATEUR RADIO

JANUARY, 1965



Vol. 33, No. 1

2/6

Registered at G.P.O., Melbourne, for transmission by post as a periodical

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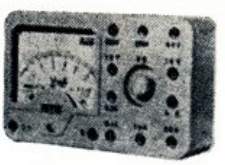

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Members of the W.I.A. should refer all enquiries regarding delivery of "A.R." direct to their Divisional Secretary and not to "A.R." direct. Non members of the W.I.A. should write to the Victorian Division, C/o. P.O. Box 36, East Melbourne. Two months' notice is required before a change of mailing address can be effected. Readers should note that any change in the address of their transmitting station must, by P.M.G. regulation, be notified to the P.M.G. in the State of residence, in addition "A.R." should also be notified. A convenient form is provided in the "Call Book".

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OUR COVER

Featured in this photograph are some past issues of the Australian Radio Amateur Call Book.

FEDERAL COMMENT

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THE SCOUT JAMBOREE

In October of this last year we had another very successful "Jamboree-on-the-Air". During December and early this month we will have the opportunity of allowing Scouts attending the Seventh Australian Jamboree at Rowville, near Dandenong, Victoria, the pleasure of talking to other Scouts and Amateurs throughout the world and locally in Australia.

Those members who took part in the previous Pan-Pacific Jamboree at Clifford Park, Victoria, will undoubtedly recall the great pleasure both they and the Scouts derived from these activities. We have no doubt whatever as to the success of the Jamboree currently being held and urge every Amateur who can organise some time to help at Dandenong, or by arranging to have boys who cannot attend the Jamboree talk to their friends in the camp.

It is with regret we pause to record the very able services of our previous night operator at Clifford Park will not be available again. We refer to Lance Frith, VK3ZA, whose key became silent in September of last year.

The questions in the minds of some may be—what does Amateur Radio gain from these activities, or why does the W.I.A. interest itself in the Scouting movement? Obviously the answers to these questions are closely related.

Firstly, the encouragement of any group of young people in the hobby of Amateur Radio is part of the aims and objects of the Wireless Institute. Secondly, Amateur Radio gains more devotees to its cause and in turn the community benefits by gaining better citizens with wider knowledge technically, geographically and of humanity on a non-political basis free of national and social barriers. Thirdly, the Institute can provide an additional interest to the boys in camp when their activities are not being concentrated on Scouting affairs.

The Federal Station of the W.I.A., VK3WIA, will be active from the camp over the Jamboree period and Amateurs should look out for this rather rare call, at the same time making their stations open where possible to local Scouts to chat with their more fortunate contemporaries at the Jamboree.

What better time for such extra-mural activities devoted to public service than over this Yuletide period when Peace and Goodwill are uppermost in our minds and thoughts. The Jamboree dates are 30th December to 8th January.

A VERY FRUITFUL AND PROSPEROUS NEW YEAR TO AMATEURS EVERYWHERE.

FEDERAL EXECUTIVE, W.I.A.

CONTENTS

MODIFYING THE PYE REPORTER MK. II. FOR H.F. NET OPERATION

E. C. MANIFOLD, VK3EM*

FIRSTLY, the purpose of the modification is to have mobile equipment capable of working on the 1825 kc. W.I.C.E.N. net frequency in VK3.

Having received a Pye Reporter Mk. II., and also having thoughts of 160 metre operation, the possibility seemed too good to pass by without further thought.

When the tube line-up in the receiver and transmitter is considered with the requirements for simple mobile or portable 160 metre gear, there appears to be a good reason to try it out and see if it is worth while.

It may be argued that the 2.9 Mc. i.f. strip would be too broad for this type of service and that interference from the Loran transmissions would be troublesome. This could be so, if the receiver was to be used near a Loran installation. However, since the answers were not available, the only thing to do was to "give it a go".

The receiver was not made tunable, although this is no problem to do. It was not necessary for our purpose, so a crystal was obtained to lock the receiver to the net frequency.

It is probable that the Reporter will be wired for 6v. operation, and if this voltage is required, no alteration to the terminal strip is necessary. But for 12 volt operation the terminal strip inside the front panel under the chassis will have to be altered.

With the bottom up and facing the front panel, remove the heavy wire bridges on the terminal strip and rebridge lugs No. 123 from the right hand end of the lug strip, add 20 ohm 3 watt resistor between lugs 3-6. Lug No. 4 is earthed, No. 5 is the relay d.c. supply and No. 7 is 6.3v. transmitter supply. The above assumes that the unit as

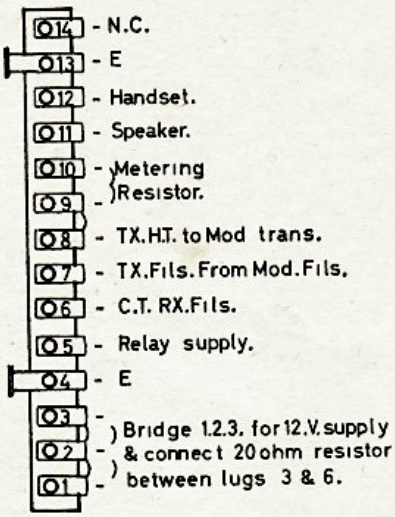


Fig.1. Terminal strip connections.

* 267 Jasper Rd., McKinnon, S.E.14, Vic.

received here was as orginal wiring. (See Fig. 1).

As there are valves which will not be required and will be removed, the remaining valve filaments should be wired as shown, and balanced as close as possible to provide 6.3v. at each valve. (See Fig. 2).

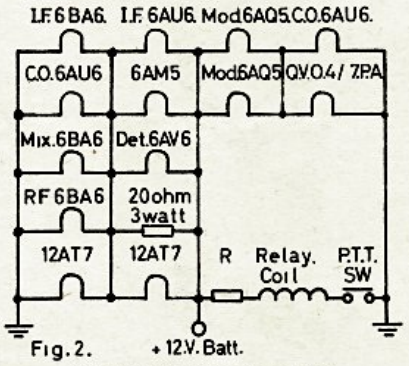


Fig. 2. Filament connections for 12V battery operation.

Remove V2, V3, V13, L2, L3, L4, T1 and associated circuits.

The existing crystal oscillator V4 is retained and is provided with a 4725 kc. crystal, used as the oscillator frequency to provide injection to the mixer (V5) for an i.f. of 2.9 Mc., which is normally the second i.f. channel.

The r.f. stage V1 is now a 6BA6 and was substituted for the original 6AK5, as it was thought that at this frequency with fairly strong b.c. harmonics, cross modulation may be experienced with a.v.c. on the sharp cut-off pentode. It was also thought that the 6AK5 could be more usefully employed in other gear at v.h.f.

The original antenna coil is rewound with 70 turns of 38 s.w.g. enamel as the grid coil. On the earthy end of the coil, wind 10 turns over the grid coil, in the same direction, with 2 mil. insulation between coils.

Insert an iron slug ½" long inside the former at the centre of the coil and cement in position, dope the windings and re-install in the original position.

In addition to the original tuning condenser, a parallel condenser of 50 pF. is connected across the grid coil to provide an improved C/L ratio at 1825 kc.

Replace the original bypass condensers on V1 with 0.01 μF. mica (or ceramic) condensers as the existing bypasses (680 pF.) are too small at this frequency.

The screen dropping resistor should be changed to 68K for the 6BA6.

As an alternative to rewinding the original antenna coil, suitable pi-wound coils which are slug tuned on a 7 mm. former are available from Ham Radio Supplies which, when tuned with 50 pF. parallel capacitance, will cover the 1825 kc. net frequency.

Turns would probably require to be removed from the smaller coil, for the antenna coil, but could be used "as is" for the r.f. coil.

However, since a number of chaps may not be able to procure these coils, details for rewinding a coil similar to the antenna coil are included.

Use a coil former of ¾" diameter, preferably slug tuned, and wind coil to the following details: Wind 70 turns of 38 s.w.g. enamel as the grid coil and over the earthy end, insulate with 2 mil. insulation, and wind 25 turns of the same wire in the same direction, for the plate coil.

Tune this coil with a parallel condenser of 100 pF. If slug tuned coil, or if you want to use the original tuning 33 pF. variable, add another fixed condenser of 80 pF. in parallel. In any case, a slug similar to the antenna coil should be cemented inside the coil former if condenser tuning is used.

Rewire the front end of the receiver to the circuit shown in Fig. 3, but as there is no alteration to the 2.9 Mc. i.f. or the audio, this section of the circuit is not included.

It seems to be that almost all of these units would require to have the diodes in the noise limiter and squelch circuits replaced and this unit was no exception. The replacements were OA85s and OA79s, each giving similar results when tried. Care must be taken to replace them in the correct polarity in each circuit in lieu of the existing diodes.

It was found that the audio gain control did not cut the audio off at minimum rotation on local signals. By-passing the earthy end of the audio gain control to chassis (with a 0.1 μF. condenser) provided better control of signal level.

TRANSMITTER

The original line-up was a 6AU6 c.o., 6AQ5 mult. and QV04/7 p.a., modulated with a pair of 6AQ5s p.p., driven by a single or double button microphone.

Quite a few ideas could be advanced to improve the audio side, but as the unit was to be simple, but effective, the original circuit was retained as it is quite satisfactory providing that the operator "talks up" to the microphone or copiability will be quickly lost.

The original 6AU6 c.o. is retained and slightly altered to suit the lower frequency of operation (see Fig. 4).

The 6AU6 plate coil is rewound with 38 s.w.g. enamel wire to the full space between the former connecting lugs, and an extra 100 pF. condenser is placed across the coil to tune it to the 1825 kc. frequency with the iron coil tuning slug.

The c.o. is capacitively coupled to the QV04/7 p.a.—the 6AQ5 (V13) being removed.

The plate circuit of the p.a. must, unfortunately, be made fully tunable, and a pi coupler has been provided to

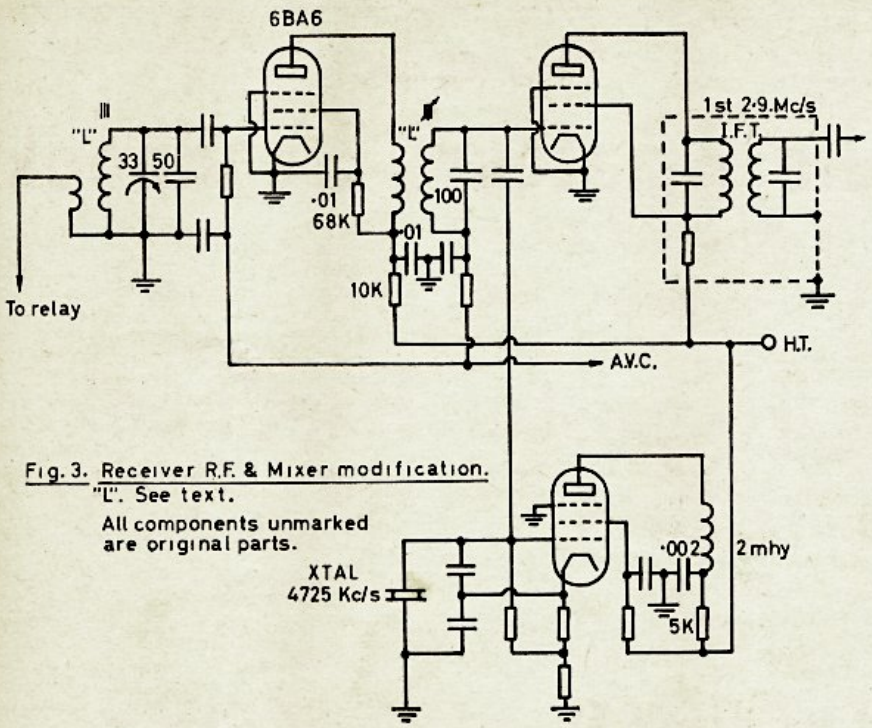


Fig. 3. Receiver R.F. & Mixer modification.
"L". See text.
All components unmarked are original parts.

cope with the various antenna lengths and positions which will be used at different locations.

This allows the p.a. to be loaded and matched to a range of low-to-medium impedance aerial feed points and was considered to provide the most flexible arrangement in the confined space available in the cabinet and chassis.

The physical layout dictated the use of miniature tuning p.a. condenser and loading condensers, which were located under the chassis, beside the p.a. valve socket, while the p.a. coil was located above the chassis, mounted from the side of the cabinet close to the p.a. valve.

This coil was wound on a ¾" diam. polystryene former, which originally was purchased full of pepper (hot stuff!) and was wound with 26 s.w.g. enamel wire to a length of 1¼", approximately 65 turns.

Transmitter tuning consists of plugging a 0-1 mA. meter into the metering plug on the side of the chassis, pins No. 4 (negative) and No. 6 (positive) and tuning for maximum grid current (approximately half scale).

Then attach the antenna (see recent notes in "A.R." for suggested antennae) and tune the p.a. to resonance, indicated by an 0-100 mA. meter plugged into the metering socket, pin No. 5 (negative) and No. 7 (positive), which should indicate approximately 28-30 mA., depending on the h.t. voltage available, and will be in the range of 250-280 volts.

Power input to the p.a. is approximately 7 watts and has been fed into a 40-metre dipole at this location for want of a better aerial, with the two feeder wires tied together and loaded against earth.

Reports received from all local stations have been between S7/9 with S5/7 from the few country stations worked to date, and although not used a great deal, has been very gratifying.

Receiver alignment is equally simple since the i.f. strip will be aligned, and the insertion of the receiver crystal with the unit powered will only require that the r.f. and mixer coils be tuned for maximum noise or, better still, to use a signal generator, Bendix frequency meter, or of course a station on the net frequency.

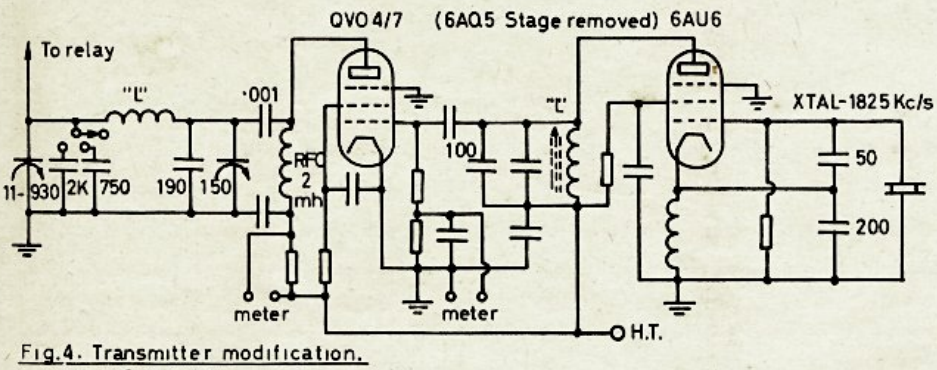


Fig. 4. Transmitter modification.
"L" See text.
Unmarked components are original parts.

It would be advisable to finally tune all circuits, i.f's. included, to a station on the net frequency.

To get indications of correct tuning for the receiver, connect a 0-10 voltmeter between the junction of the two noise limiter diodes and earth. This will give a sensitive reading for all receiver adjustments.

As mentioned at the commencement of this article, Loran signals are audible at this location, only when there are no stations working on the net frequency and the squelch circuit inoperative.

Loran signals are not strong enough to operate the squelch circuit, which will operate on signals which are S3/4 and over.

Signals from the VK2 net, which is 5 kc. removed from the VK3 net, are copiable on the receiver, but are not particularly strong and have not yet operated the squelch circuit to date.

No actual selectivity or sensitivity tests have been made on the unit, but listening tests have indicated that the unit modification is satisfactory for the purpose.

There appears to be no reason why this gear should not be modified to operate on the 27 and 28 Mc. bands as mobile and fixed portable equipment, to make use of a frequency allocation which has been almost neglected, and which for some considerable time will not be useful as a DX band.

Aerials for these bands are comparable with the centre loaded whip aerials of the lower frequencies for length, but do not need the loading coil to make them resonant at these frequencies.

And finally, considering the number of tubes and parts in one of these chassis one could not get on the net frequency any cheaper, the crystals being relatively the dearest parts.

Attention is drawn to several interesting articles in "A.R." in recent issues, to which reference has been made, in modifying this equipment for the 160 metre band. ●

☆

1965 FRENCH CONTEST

Dates: C.w. from January 30, 1400 G.M.T., to January 31, 2100 G.M.T. **Telephony** from February 27, 1400 G.M.T., to February 28, 2100 G.M.T. V.h.f. from May 1, 1800 G.M.T., to May 2, 1800 G.M.T.

Code: RST/RS and number of QSO.

Multiplier: Each French station gives his number of department after their call. For each band, one point per each different department or each different D.U.F. country other than F or FC.

Scores: 3 points per each QSO and multiply this total by the total of all multipliers.

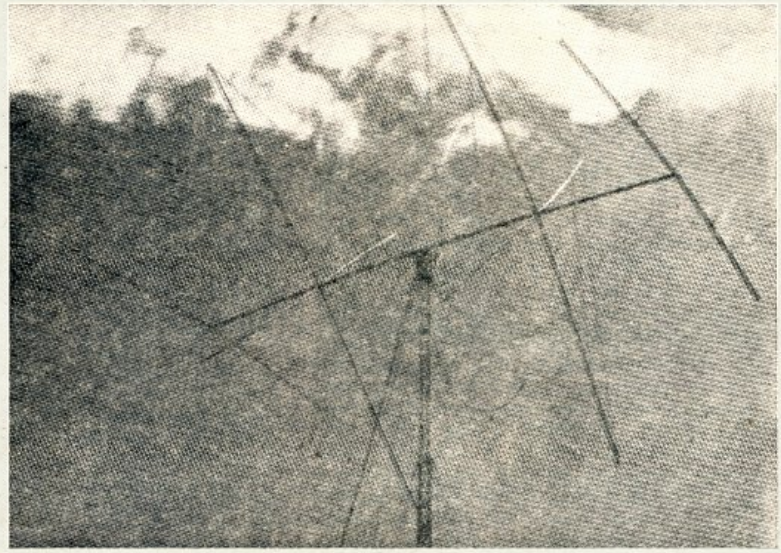
For this R.E.F. anniversary, all stations who send a log for more than 1,000 points, receives a special certificate.

R.E.F. Award: Reference to any log sent is available for any French Award application: D.P.F., D.D.F.M., D.U.F., D.T.A., during two years, total or, partly with QSL of other QSO in complement.

Send log to R.E.F., B.P. 42-01, Paris R.P., France.

A CUBICAL QUAD CUM YAGI*

RALPH TURNER,† VK5TR



● **This 20 metre antenna combines the features of the Quad and Yagi antennae for simple construction and improved performance. The information given is also valid for the conventional two-element Quad and can help to improve performance of these antennae.**

THE two element cubical quad is, in the writer's opinion, the best all round antenna yet devised. When assessed on a forward gain, angle of radiation, front to back ratio, and low initial cost, as compared to any other type of antenna, for similar performance, it excels.

I have had so much success with the two element quad that, after listening to G3VNA, it was decided to try his approach to quads. G3VNA uses a quad with two conventional elements plus a Yagi type reflector and director. As a result, G3VNA puts the best and most consistent signal into VK5 land.

I have talked to many Hams all over the world who have built quads and have come to the conclusion that only about 50% of them have been satisfied that their quads are really working at their peak performance. Most think their quad is working but they are not confident enough to say that they **know** that it is working 100%.

The reason for the failure to get a quad working properly is, in my opinion, due to four main points which are as follows:

1. The exceptionally high Q of the reflector.
2. The fact that it appears to be impossible to accurately "grid dip" a quad radiator.
3. The disastrous effects that metal spreaders have on the operation of a quad.
4. The interaction between the radiator and reflector elements.

HIGH Q

The two elements of a quad could be viewed as the two tuned circuits of a very high Q i.f. transformer, where tuning one coil detunes the other. Those readers who have tried to band pass a series of tight coupled i.f. transformers will appreciate that trying to tune these circuits is like a dog chasing its tail.

The Q of a quad reflector is so high that it is practically impossible to tune it except by remote means, the proximity of a hand being sufficient to move the resonant frequency many kilocycles. If this effect is clearly understood you are on the way to success with your quad.

Obviously the design of the reflector should be such that any alterations that have to be made to the length of this element can be made without too much pain or strain.

We found that using a loading coil in place of a tuning stub broadened out the characteristics of the reflector and was a whole lot easier to adjust than a stub.

GRID DIPPING QUAD RADIATORS

For some reason unknown to the writer, a quad radiator **cannot** be grid dipped in the same manner as a yagi element. This peculiar effect has resulted in all sorts of varying lengths of radiator elements being published. We suggest that the lengths specified, 17 ft. 2 in. on all sides, be strictly adhered to until final adjustments are made. The only method of determining the resonant frequency of a quad is by means of an s.w.r. meter. The frequency indicating the lowest s.w.r. is the resonant frequency of the quad.

METAL SPREADERS

The writer has not been able to make a quad work efficiently when metal spreaders were used. The reason for this effect is not known.

INTERACTION BETWEEN ELEMENTS

The quad is basically two high L, low C tuned circuits with a high degree of coupling between the elements, and, as with any such circuit, the tuning of one circuit detunes the other. Hence, the advice that the lengths of the radiator must be left alone until the correct length of the reflector is determined by means of adjusting the loading coil.

DESIGN

Well now so much for the why; now for the how. For mechanical balance it is necessary to have four elements on a quad. It is impractical to have three elements, as the quad radiator would be hard up against the tower, or alternatively the weight of the elements on the boom would not be evenly distributed. The yagi elements were thought to be easier to construct than additional quad elements, but no claim is made for performance as compared to a four element quad.

Boom: As we had a light telescopic mast made of three 15 ft. sections, a portion of this was used as a boom. The 15 ft. length of 2" o.d. was used as the main boom, with the 15 ft. of 1¾" o.d. section cut in half and used as extensions to mount the yagi reflector and director. This procedure allows the spacing between the yagi and quad elements to be adjusted to some extent.

The ends of the main boom are cut every ¼" for a length of 2" and a radiator hose clamp is used to tighten the end of the main boom on to the extension boom. When optimum spacing is selected, the two booms should be drilled and locked up with self-tapping screws.

Yagi Director and Reflector Mountings.—In order to mount the directors and reflectors on the extension booms, a 3" length of 1" o.d. x 16 gauge steel tube is welded at right angles to the boom. The boom end is filed out to fit and slightly flattened on two sides to meet the diameter of the smaller tube.

A 15" length of ⅜" wood dowel, well varnished, is passed through the 3" length of tube so that six inches projects on each side of the mounting. The yagi elements slip over the wood dowel to a length of 5". This is shown in Fig. 1.

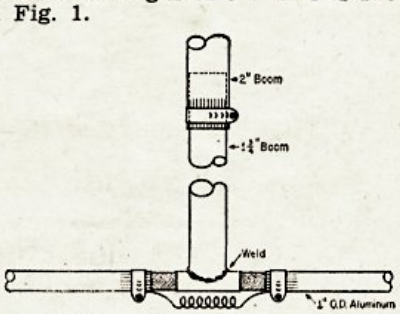


Fig. 1.—Method of mounting the yagi reflector and director to the boom ends is shown above. The details are given in the text.

* Reprinted from "CQ," August, 1964.

† 25 Austral Avenue, Linden Park, South Aust.

Yagi Elements.—The yagi elements consist of four 12 ft. lengths of 1" o.d. x 16 gauge aluminium tube, two for the reflector and two for the director. This length was chosen at random and has no special significance. The inboard end of each element is cut in four places with a hack saw to a length of 1½" for clamping purposes. The tube is pushed over the piece of ⅞" dowel, leaving a space of 1" between the end of the tube and the steel mount.

The elements are clamped to the wood dowel by means of two 1" diameter hose clamps. These clamps also serve to mount the loading coils.

Yagi Element Support.—In order to prevent the sag in the 1" aluminium tubing, five 5" t.v. type stand-off insulators are mounted along each element as shown in Fig. 2. Two ⅛" diameter holes are drilled approximately ¼" in from the end of the elements and a No. 16 wire loop tied through each hole. Two lengths of 100 lb. nylon fishing line are tied to one end, then passed through the stand offs and tied to the other end of the element. If the nylon is tied when the element has an upward curve, the entire element should become straight when mounted on the boom.

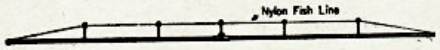


Fig. 2.—The director and reflector would sag without the support shown above. Nylon fish line, 100 lb. weight, is stretched through five 5" t.v. stand-off insulators.

Quad Spider.—The quad spider is designed to rotate on the boom; this enables the elements to be strung by rotating the spreaders like a windmill and also allows the distance between the quad elements to be varied easily.

The spider mount consists of a 12" length of 2¼" 18 gauge steel tube. Four pieces of 1" i.d. 16 gauge steel tube, 15" long, are welded to the mount in the form of a square, as shown in Fig. 3. One end of each of the four pieces of tube are filed to fit perfectly before welding. It is highly desirable to use a jig for setting up, as the tube will move during welding and will not finish up square.

When the spider is welded, four 3/16" holes should be drilled adjacent to each weld to allow for drain out of any water that seeps into the spider.

Two ⅜" steel nuts are welded to the spider mount to provide fixing to the boom. These nuts are easily held in position for welding if the tube is drilled and tapped first and a stud screwed through the nut and the tapped hole.

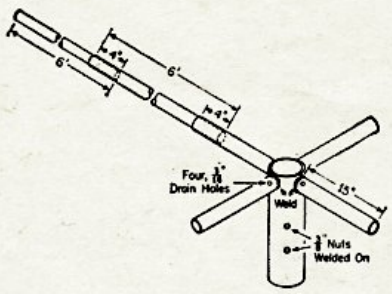


Fig. 3.—Details of the spider and spreaders. If bamboo spreaders are used, commercial spiders would be suitable.

★

Fig. 5.—Overall view and dimensions of the yagi-quad. The quarter wave matching stub is described in the text. The quad elements measure 17 ft. 2 in. on all sides. The co-ax. feed-line is supported by a nylon line, to the boom, to prevent sag.

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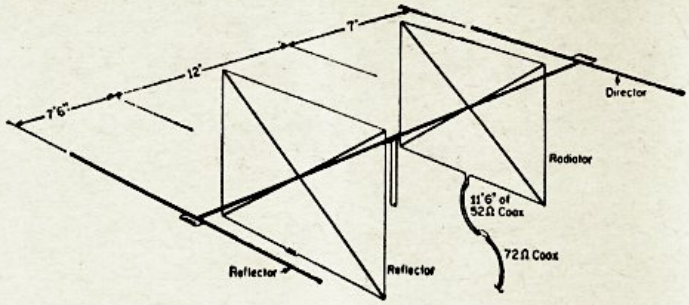


SPREADERS

In the interests of economy and for reasons previously stated, the spreaders are half of aluminium tubing and half of wood dowel. Bamboo canes, where available, are ideal but are not readily available in this neck of the woods.

The aluminium spreaders are six feet of 1" o.d. 16 gauge tube. The wood spreaders are six feet of ⅞" wood dowel which should be varnished with three coats before assembly. The aluminium spreader is pushed into the spider for a distance of 4" and held in position by means of two ⅛" x ½" self-tapping screws.

The wooden spreader is pushed into the end of the aluminium spreader for a distance of four inches and is held by means of two ⅛" x ½" self-tapping screws. Drain holes should be drilled in the aluminium spreader adjacent to the end of the wooden dowel on the two bottom spreaders.

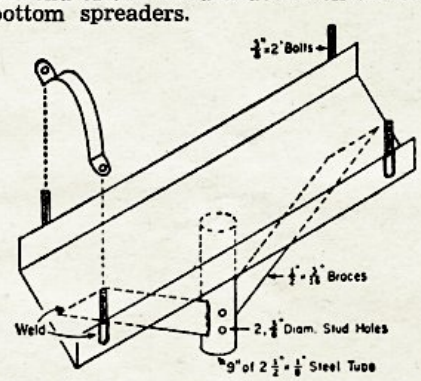


Fig. 4.—The boom mount is made of a 2 ft. length of 2" x 3/16" channel with four 3/8" x 2" bolts welded as shown. The clamps are 2" x 3/16". The support pipe is braced diagonally by ½" x 3/16" stock.

STRINGING QUAD ELEMENTS

The quad elements consists of 68 ft. 8 in. of No. 14 bare copper wire. Other wire of similar size will do but stranded wire is preferred because of its greater flexibility. Two lengths of wire should be run out and pre-stretched and marked at 17 ft. 2 in. with plastic insulation tape. Marking should start from the middle of the 69 ft. to allow for the half lengths of wire from the bottom spreaders to the feed and coil points. When the wire is marked at the centre point, two points 8 ft. 7 in. each side of the centre should be marked. Now remove the centre marking and measure the other points.

In selecting the spreaders which are to be at the top of the quad, remember that you have to tighten up the ⅜" set screws on the spider after the wire is fastened. These screws are more easily tightened when they are projecting downwards.

Fasten the wire to the top spreader by means of an insulated staple. The staple is not hammered home but allows the wire to pass freely through it. This allows the spreaders to be adjusted so that they are all in line and straight. The spreaders are now rotated like a windmill and the wire is fastened to each spreader.

It is wise to connect the plastic terminal block to the two ends of the wire in order that the bottom side of the wire may be set square. Once the wire has been fixed at all four points the array can be checked for "squareness" and the staples driven home.

Both the quad elements are identical in length of wire and method of fixing. The two quad elements should now be spaced 6 ft. each side of the centre of the boom and the set screws locked up. A boom mount is shown in Fig. 4. The final position of the elements is shown in Fig. 5.

SQUARE OR DIAMOND

The square type set up is used in preference to the diamond owing to the difficulty experienced with entanglement with guy wires when a diamond shape was used. It has been stated that the diamond set-up gives 1 db. more gain but our tower and guys did not allow a true comparative test.

YAGI LOADING COILS

As the yagi elements are shorter than the required electrical length, loading coils are necessary. The director coil is 11 turns of 14 gauge copper, wound 1" in diameter over a 2" length. The yagi reflector coil is 22 turns of 14 gauge wire, wound 1" in diameter over 4". The ends of the coils project for approx. 2" and are hammered flat and slipped under the 1" diameter hose clamp.

The yagi elements should be pre-tuned to the approx. frequency by means of a grid dip meter before fixing to the boom. Remember that in mounting the yagi elements on the boom the coupling to the other elements will lower the inductance of the loading coil and consequently more turns on the loading coil will be required. We tuned our elements to the desired frequency before mounting on the boom, with the coil wide spaced and then squeezed the coil together to hit the correct frequency when the elements were mounted on the boom.

If a portable grid dip meter is not available a two-turn link each end of a two-conductor flexible cable can be used to couple the yagi loading coils to a grid dipper for accurate tuning.

The yagi reflector and director must be tuned to between 5% and 6% lower and higher respectively in frequency

than the desired resonant frequency of the quad radiator. For example, if the desired resonant frequency of the antenna is 14,250 kc., the director will be tuned to 13.537 kc. and the reflector to 14.962 kc. The antenna will not work 100% unless these elements are correctly tuned **on the boom.**

QUAD RADIATOR MATCHING

With the dimensions given it was found that the feed impedance of the quad radiator was approx. 38 ohms. Our method of feed was to use a 70 ohm co-ax. cable with a quarter wave matching section of 50 ohm co-ax. at the antenna end. The impedance transformation is thus:

$$Z_m = \sqrt[2]{Z_L \ Z_A}$$

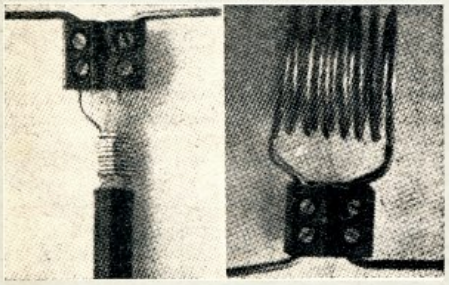
where Z_m = Impedance of required $\lambda/4$ section.
Z_L = Impedance of feed line.
Z_A = Impedance of antenna feed point.

$$Z_m = \sqrt[2]{72.38} \approx 52.5 \text{ ohms.}$$

The quarter wave section is 11 ft. 6 in. long and should be well spliced and soldered to the 70 ohm co-ax. and waterproofed with plastic tape.

TERMINAL BLOCK

A plastic cable connector is used to connect both the feed points on the quad radiator and the coil on the quad reflector. This connector is a handy device and it simplified the replacement of the co-ax. feed as the cable usually breaks, due to flexing by the wind, at the feed point.



Photographs illustrating the use of plastic terminal blocks for connecting to the quad reflector and driven element.

QUAD REFLECTOR LOADING COIL

In order to obtain the correct electrical length of the quad reflector it is considered that a coil is easier to handle and adjust than a stub as it does not flap around in the wind.

The coil is 7½ turns of 14 gauge copper wire 1¼" in diameter, air wound, and is adjusted by means of squeezing the turns together.

Remember the previous warning; the Q of the quad reflector is so high that the proximity of a hand is sufficient to detune it many kilocycles. This element should be roughly tuned for the maximum front to back ratio by turning the antenna back on to a fixed signal. Adjust the coil for minimum received signal. Raise the quad to its full height and check the F/B ratio; it should be in the order of 40 db. It will probably be found that it is necessary to increase the inductance of the coil slightly as the extra height above ground will lower the effective inductance.

A simple method of checking the accuracy of the setting of all coils is to tape a 6" length of ferrite rod and brass rod about 3" apart on the end of a long pole. This enables the coils to be checked at a much greater height than can be done otherwise. Inserting the ferrite rod will increase the inductance and the brass rod will decrease the inductance and thereby indicate which way the coils should be moved. Both the ferrite and the brass rods should be covered with insulating material to prevent shorting the turns of the coils.

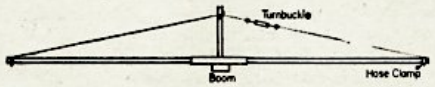


Fig. 6.—To prevent boom sag a 2 ft. length of ½" steel tubing was welded to the side of the boom mount. A 3" ¼" diameter is welded to the top of the rod as a hook to support the 1/8" stranded steel cable. The tension is adjusted with the turnbuckle.

RESONANT FREQUENCY AND S.W.R.

As no way has been found by the writer to grid dip a quad the method of checking the resonant frequency is by means of an s.w.r. meter. With home-brew meters make sure the meter will zero on a 70 ohm dummy load before starting to test the antenna. Our s.w.r. meter zeroed perfectly on low power, 20 watts, but would not zero on full power.

Starting at 14,000 kc., take readings of the s.w.r. at 50 kc. points up to 14,350 kc. and plot the s.w.r. against the frequency. It should be found that the s.w.r. is lowest on 14,250 kc. and should be not more than 1 to 1.07 at this frequency. The s.w.r. will rise rapidly each side of the resonant frequency. If the indicated frequency is other than desired, the quad radiator can be shortened by bridging out one corner or lengthened by adding a piece of wire in the bottom section.

Differing ground, mast, guys and proximity to other buildings can all cause changes in the resonant frequency of the system.

Checking the front to back ratio on transmission should be carried out with a station at least 1,000 miles away as local checks are very apt to be erroneous due to radiation from other antennae and buildings. One local Ham 7 miles away measured our F/B ratio 12 db.; two others, one in Hawaii and the other in California both said the F/B ratio was in excess of 40 db.

PAINTING

The spider and booms should be galvanised, but if such treatment is not possible all steel should be treated with a rust inhibitor and painted with two coats of zinc base primer and two coats of silver finish. Careful preparation of all steel work prior to painting will be well repaid by the long rust-free life of the work.

BRACING

Due to the light material used in the "boom," a 3/16" stranded steel cable brace was fitted as shown in Fig. 6. The cable can be fastened at each end of the boom with hose clamps. A 2 ft. long vertical post was fastened to the centre of the boom or mast. A light turnbuckle provides for adjusting the tension of the cable. Nylon fishing line of 100 lb. weight is used to brace the quad spreaders. The line is fastened to the ends of the boom and tied to each spreader at about 9 ft. above the spider. This bracing really stiffens the spreaders. ●

The Historical Development of Radio Communication

PART TWO—THE EARLY PIONEERS

J. R. COX,* VK6NJ

CHAPTER 1

1. THE ERA OF EXPERIMENTATION

The technique of radio communication is a modern art originating early in the 20th century. Its basic technology, however, is not as recent, for it began to gather in the 19th century. For it was in that era that the germ of the idea of communication by wireless began its development. Also, stretching farther back in time, there lies man's innate urge to communicate with his fellows and the need to convey information from one point to another in space.

From the earliest times history is studded with incidents which depict the necessity and value of communication. This necessity prompted inventiveness towards speeding up the existing means of communication. It is recorded that in 500 B.C. two hundred miles were covered in forty-eight hours by mounted messengers for Darius and Xerxes of Persia. As a speedier means of transmission in the same period, important announcements were shouted and relayed across from one point to another by watchmen. Surely a very public system of "**wireless**" communication, using as a medium of transmission not electricity, but sound waves. This method conveyed messages thirty times faster than by using horsemen.

As well as acoustic arrangements, visual transmission was employed. Both the Greeks and Persians employed lighted torches to represent letters of the alphabet and thus, by various combinations, conveyed messages. The Romans and Carthaginians under Hannibal used similar schemes, and we are well acquainted with the Englishman Drake's warning system of a relay of bonfires to signal the approach of the Spanish Armada. American Red Indians, as well as other races, used a code of smoke puffs to form intelligible signals transmitted over wide distances.

2. THE ERA OF COLLATION

Just two centuries after the defeat of the Armada, about the time of the French Revolution, great efficiency and speed were achieved with a visual telegraph system invented by a twenty-nine-year-old priest named Claude Chappe. His optical system involved the arrangement of small bars suspended from a chain of high towers at conspicuous points. Using a code devised by the inventor, the repeating towers accomplished amazing rapidity of transmission. From Paris to Toulon is a little over four hundred miles, yet it was possible to send a message between the two points in twenty minutes.[10] Man's employment of all these visual methods illustrates his use of the medium of light waves, very much **faster** than sound, for quick **transmission of** messages. Unfortunately the medium also was **public** and so there arose a desire for an **invisible** medium to ensure privacy of the message. Impressed with the value of Chappe's system, Napoleon Bonaparte later commissioned a scientist, Doctor Von Sommering, President of the Bavarian Academy of Science, to improve on the method.[11]

Von Sommering was interested in electricity, then known as galvanic current, and little understood. He decided that improvement might lie in utilising galvanic current as a medium of transmission. Knowing that electric current possessed the property of decomposing water into hydrogen and oxygen, he set about to devise the first **electric** telegraph. In so doing he was attempting what had not been tried before; the substitution of the **obvious** media of sound or light waves by the use of a **possible** new medium, **electric** current. Von Sommering's crucial decision must be regarded as a basic step towards wireless communication because it initiated the idea, the possibility of amalgamation between transmission of messages and electric current. Notable enough for its speed, Claude Chappe's system is historically important also for another reason. His success was instrumental in bringing about the introduction of Von Sommering with his scientific thought, for, from this point on, theory and research on electricity and magnetism were linked with the concept of electrical transmission of messages.

Drawing upon the facts established experimentally by Stephen Gray, who, about 1729, discovered electrical conductivity,[12] the idea of using continuous transmission wires arose. Von Sommering's telegraph proved impractical because of the thirty-five wires it involved, but it aroused interest and assisted development.

One of those intrigued by Von Sommering's "bubble telegraph' was his colleague, Karl Friederick Gauss, then Director of Gottingen Observatory.[13] Gauss was aware of another discovery made by a Dane named Hans Christian Oersted. This man had found that a compass needle was deflected when placed near a wire through which was passing an electric current, and, when the current near the needle was at zero, the needle returned to its original at rest position. This finding was to prove of cardinal importance, because it displayed the connection between electricity and magnetism. Thus provided, Gauss realised the proper sequence of ideas: electric current: wire conductor: magnetic needle: telegraph. Gauss was friendly with a Professor Weber and together, in 1832, they worked to produce the first **successful** two-wire electric telegraph.[14]

Six years later, Carl August Steinheil, acting on a suggestion made by Gauss, demonstrated that the earth could perform the function of a return path for a telegraphic circuit.[15] Steinheil was not the first to employ the use of the earth as a return half of a circuit, but he was the **first** to realise its importance and to apply it to practical telegraphy. What Steinheil did do was provide a system with **one wire less.**

This innovation was an important step towards the advent of wireless communication because it facilitated progress in two ways. In the first place it afforded a mental stimulus towards the feasibility of one day having telegraphic communication without the necessity of a continuous metallic link. The fact of one wire being proved redundant stirred thought towards the removal of the one remaining strand. From then on scientific workers were intrigued by the possibility of a wireless communication system. The second point about Steinheil's adaptation was one of finance. Using only one wire instead of two reduced installation cost considerably and thus made the introduction of more schemes economically possible. This factor in turn speeded up the rate of expansion, and its success excited attention elsewhere, and a demand for similar telegraphic systems in other lands.[16]

Within the next few decades wire telegraphy had assumed gigantic proportions. The widespread use on land led to the concept of inter-continental links and in 1850 England and France were connected, to be followed, on 4th August, 1858, by the cable connection of Europe and America. Towards the end of the century there were 318 links with a total of 250,000 miles of cable.[17]

Over this era of telegraphic expansion there was a call for continual improvement which resulted in the development of appliances and managerial skill of a high order. Thus telegraphic engineers of this period unknowingly aided the foundation of wireless communication. The pioneers of the latter were fortunate in being able to adapt some of the material and technique from an already proven system for the furtherance of radio communication.

One of those to thus assist was the son of an American clergyman and an artist. At the age of forty-one, Samuel F. B. Morse was returning to the United States in 1832 from Europe where he had heard about the Englishman Faraday's electro-magnetic experiments.[18] He had also heard of the European electrical transmission of information and was convinced that a way could be found to transmit messages electrically over a long distance. He turned his powerful creative talent from art to science and set to on fashioning apparatus involving the principles of

* Government School, Yornup, W.A.

[10] Gartmann: op. cit., p.128.

[11] Ibid., p.129.

[12] Lemon and Ference: "Analytical and Experimental Physics", University of Chicago Press, U.S.A., 1942, p.240.

[13] Gartmann: op. cit., p.129.

[14] Ibid., p.129.

[15] Ibid.

[16] Some branch-line telephone systems in the W.A.G.R. employ the Steinheil earth return system even now.

[17] Gartmann: op. cit., p.134.

[18] United States Information Service Booklet, "Twelve Inventions That Changed the World," 1960, p.10.

an electric current producing magnetism. Using a key to stop and start the flow of electricity in the circuit he employed an electro-magnet to press a pen against a uniformly unrolling tape. A short press on the key created an electrical impulse which flowed along the wire conductor. This electrical current activated the electro-magnet which in turn marked the tape for the duration of the current flow. A short impulse produced a dot and a long press on the key a longer impulse and hence a longer mark (—) called a dash. By a combination of dots and dashes, Morse, like Chappe before him, created a code. This, named the Morse Code and patented in 1840, was an innovation which, together with the Morse Key, proved to be of great worth when wireless telegraphy eventually was realised. This may be regarded as the end of the period of collation.

Later another American inventor discovered that Morse messages could be read by **sound** alone.[19]

With the means of "writing" and receiving messages by sound, a desire, a dream, of speaking at a long distance materialised. Like telegraphy, the pursuit of this goal was to materially aid the later advent of radio communication in the form of wireless telephony. Orthodox electrical engineers scoffed at the idea of transmitting speech over wire using electric current. It was left to a Scottish elocution teacher, who emigrated to America, to prove the experts wrong. Alexander Graham Bell began as a novice electrical inventor. He was no novice with regard to the study of the human voice, however, being a Professor of Speech Physiology.

Bell had heard of experiments being carried out by a German physics teacher named Philipp Reis who had conceived the idea of a telephone before Bell. His device transmitted audible sounds, but it was not a "speaking" telephone.[20] A. G. Bell's belief in the possibility of speech transmission was held to ridicule by orthodox electrical engineers. They contended that transmission of speech by a continuous electric current was impossible because of the many overtones involved. Professor Bell well realised the truth about the speech part but his **lack of electrical knowledge** meant that he could not see the impossibility of combining the two. Because of his persistence, Bell was held to personal ridicule, spent all of his capital and suffered ill health, but he pressed on to achieve one of the world's great technological advances.

Analysis of the problem caused Bell to decide that the air vibrations of speech would have to be changed into an identically varying, continuous electric current for sending speech, and then converted back to sound, or air vibrations, so that the human ear could hear at the receiving end. Together with his colleague, Thomas A. Watson, Bell commenced his experiments in 1874 and successfully transmitted speech during 1875. Thus the telephone was born.[21]

With the telephone[22] came into existence two essential appliances necessary for successful radio telephony; namely, the microphone and earpiece. The basic principles underlying Bell's instrument are used today in wireless communication. Especially is this so in portable equipment where, for communication, microphones depend upon sound waves impinging on a diaphragm and compressing carbon granules, while the headsets rely upon similar diaphragms to reverberate the air in accordance with the fluctuation of electric current received.

Thus, by 1875, there existed two means of using electric current to transmit speech and telegraphy over distance. Both depended upon wires connecting receiving and sending apparatus. The need now was for the harnessing of some invisible connector to substitute for the metallic conductors and so bring about the advent of wireless communication. This concept was near-fantastic to most, yet further research was just about to open the way to new lines of investigation which ultimately were to lead to the achievement of communication without wires.

As long ago as 1820 it had been known that a magnetic field is always associated with an electric current.[23] Eleven years afterwards Michael Faraday, the self-taught son of a smith, observed that oscillations set up in one circuit could promote secondary oscillations in another circuit set up at a distance from the primary one. Michael Faraday reasoned that there had to be some conductive link between the primary and secondary circuits. He stipulated that transfer of electrical charge from one circuit to another could not occur unless there was some medium for conduction. His ideas were not in accord with traditional viewpoint and were ignored. It was at this juncture that a friend and colleague mathematically explained and confirmed Faraday's contentions. James Clerk Maxwell was the originator of the resultant profound stipulations which formed a paper titled "A Dynamical Theory of the Electro-Magnetic Field". This paper was read to the Royal Society on 8th December, 1864, and subsequently printed the next year.[24]

Maxwell's hypothesis was important because he suggested that light waves were electro-magnetic in character and that it should be possible to produce waves of longer wave length than light by causing "an electric displacement through a dielectric".[25] Maxwell did not stipulate how this electric displacement could be done, but a later experimenter did. Maxwell's work was a forecast of electro-magnetic wave radiation upon which wireless transmission depends. The abstractness of Maxwell's theories,[26] plus the fact that they were a radical departure from orthodox opinion of the period, precluded ready acceptance and this denial outlasted his life.

The importance of Maxwell's contribution to the later development of wireless communication is absolute. It was not only that he verified Faraday's ideas but, more significantly, that his translation of the facts of Faraday's experiments into the language of mathematics gave science a new means of regarding electrical phenomena. It was to be nine years after Maxwell's death in 1879 before a brilliant experimenter established, experimentally, the veracity of his propositions beyond doubt.

This man was a young German intellectual, Professor Heinrich Rudolf Hertz. By direct experiments he provided the evidence necessary to substantiate Maxwell's theories. The acceptance and proof of Maxwell's stipulations depended upon the fashioning of a device to bring about the electric displacement through a dielectric and thus generate electro-magnetic waves sufficiently strong to be measurable at a distance. Measurement **at a distance** was able to demonstrate that an electric current **was produced** by the charge of electric displacement and that the current **was conveyed** through space.

Designing an appliance called an oscillator, Hertz used air as a dielectric which broke down as an insulator, and became a conductor, when a critical value was reached by an accumulating electro-motive force. Conduction was shown to be intermittent, evidenced by a rasping spark, and the energy aroused unleashed the propagation of electro-magnetic waves in the surrounding space. By mounting a galvanometer away from the oscillator, Hertz showed how the instrument's needle was deflected each instant the spark flashed. The deflection was indeed detection of the electro-magnetic waves by measurement of their current value.

Another method of detecting the electro-waves, to be later styled Hertzian waves, was demonstrated also by Hertz when he fashioned a "resonator". This appliance, when in the path of Hertzian waves propagated from the spark-gap transmitter, evidenced their presence by producing a small spark between its points. By a series of experiments Hertz demonstrated how the waves passed through some materials, were deflected by others, and absorbed by yet others.

The research by Hertz had important repercussions on the development of radio communication, although Hertz, himself, considered his gear of little practical value.[27]

Elsewhere, however, Professor Hertz's findings triggered off speculations on the possible use of electro-magnetic waves in transmitting messages. Thus a new field of experimental research was laid open and resourceful minds probed

[19] Discovered by Alfred Vail who at one stage assisted Morse financially. United States Information Service: op. cit., p.10.

[20] Gartmann: op. cit., p.135.

[21] United States Information Service: op. cit., p.12.

[22] The term telephone was known before Bell's invention. It had been coined by a Britisher, Charles Wheatstone, to describe his non-electrical sound transmitter.

[23] This had been discovered and experimentally displayed by the Danish physicist, Hans Christian Oersted. Lemon and Ference: op. cit., p.244.

[24] Fleming, J. A.: "The Principles of Electric Wave Telegraphy and Telephony," Longmans Green and Company, London, 1910, 2nd edition, p.340.

[25] Ibid., p.363.

[26] Mr. Oliver Heaviside, by his writings, later gave a fuller appreciation and simplification of Maxwellian theory. Lee, Sir George: "Oliver Heaviside"; Longmans Green and Company, London, 1947; p.13.

[27] His oscillator was distinctly adaptable to the practice of radio communication as was later proved, but he did not concern himself with the issue.

towards the possibility of somehow utilising the properties of Hertzian waves for wireless telegraphy. Some discerned its imminent usage. Sir William Crookes,[28] when speaking of electro-magnetic waves in 1892, said, "Here is unfolded to us a new and astonishing world; one which it is hard to conceive should contain no possibility of transmitting and receiving intelligence. Here is revealed the bewildering possibility of telegraphy without wires, posts, cables, or any of our present costly appliances."[29]

Meanwhile, since Hertz's use of his resonator, methods of detecting electro-magnetic waves had improved. The main contributor to this advancement was a Parisian, Professor E. Branly. In 1890 Branly published an account of his experiments dealing with his observations on the change of conductivity of loosely compressed metallic filings under the influence of electro-motive forces. Similar observations had been documented as early as 1835 by Munk, of Rosenchoeld, so that Branly was not a lone pioneer in this field. Munk described the permanent increase in conductivity of a mixture of tin filings resulting from the passage through it of an electrical discharge. In 1866 two brothers, C. and S. A. Varley, also noted that "powdered conducting matter offers great resistance to a current of moderate tension, but offers little resistance to a current of high tension."[30] Later Professor E. D. Hughes, of England, and T. Calzecchi Onesti conducted experiments on the changes of electric conductivity of loosely packed metallic powders under various electro-magnetic forces, but they did not progress beyond the findings of the Varley brothers and the observations attracted little attention at the time.

The important thing about Branly's work was that it produced the discovery that loosely congregated conductors were changed in conductivity by an electric spark **at a distance.**

Thus a new device for the detection of electro-magnetic waves was given to science by Professor Branly in the form of a tube or box containing a metallic filling rather loosely packed between metal plugs. Like his predecessors, Branly used a Leyden jar to produce the spark and like his predecessors, too, his annotations did not receive undue notice. They were to receive full attention, however, when repeated two years later by a Dr. Dawson Turner in Edinburgh. A Leyden jar was being used by Dr. Turner to produce a spark, and in the discussion which followed his discourse the important query arose: "Would Branly's device break down its resistance if acted upon by Hertzian waves?"

This question indicates the indecision surrounding Branly's observations. Conjecture persisted as to whether the cause of lessened resistance in a Branly tube was due to the electro-magnetic waves created by the spark of the Leyden jar or the light waves produced by the spark's flash. An Italian, G. W. Minchin, closed the debate when he gave evidence that the action discovered by Branly had its origin in electric waves sent out from the spark.

In 1894 the name "coherer" was bestowed upon Branly's tube and other similarly arranged devices. These coherers were to form "the eye" to discern the invisible link of wireless waves when radio arrived.[31]

Even as late as 1894 attention, in the main, was not directed towards using electro-magnetic waves for wireless telegraphy. Research until then was mostly concerned with studying the similarity between electro-magnetic and light waves, not to the practical application of these electro-magnetic waves.

There was an incident in 1894, however, which directed more scientific thought towards wireless telegraphy. This was Sir Oliver Lodge's lecture delivered on the work of Hertz.[32] Many of the experiments were repeated and a notable scientific audience once again witnessed the Hertzian oscillator cause an electric spark which had the power to deflect a galvanometer needle at a distance. Undoubtedly the quandary of how to use this property, to send and receive telegraphic messages, was pondered over.[33]

One attracted to the subject by Sir Oliver Lodge's address was Alexander A. S. Popov, of the Imperial Torpedo School, Cronstadt, Russia. Popov repeated the experiments, for lecturing purposes, and utilised the equipment for registering electrical perturbations taking place in the atmosphere. He employed a Branly-type coherer involving his own modification; two platinum leaves down opposite sides of the glass tube with loosely packed iron filings between. Popov collected the atmospherical electrical discharges by a lightning rod, detected them by the coherer and recorded their incidence by coupling a Richard Recording Cylinder to this circuit. His equipment was set up at the Meteorological Observatory of the Forest Institution of St. Petersburg in July 1895 and between then and 1897 it successfully operated as a lightning indicator and recorder. Popov was in effect using what is now termed an "antenna" for receiving "wireless" waves.

Around Popov's name controversy exists. The Russians claim that he gave a public demonstration of the world's first radio set in 1895—before Marconi to whom the Western world credits the discovery.[34]

It should be emphasised that the prime object of Popov's work was the study of atmospherical electrical phenomena and for this purpose he fashioned his circuits.

Published in 1896, the description of Popov's investigations concluded with these remarks: "In conclusion, I may express the hope that my apparatus, with further improvements, may be adapted to the transmission of signals at a distance."[35] This certainly indicates, at least, that he had entertained the idea of wireless communication. He continued by saying, "as soon as a means for producing quick electric vibrations possessing sufficient energy is found." From this it seems logical to accept, and believe, that he had not overcome the **practical difficulty** of generating or radiating sufficiently strong electro-magnetic waves to carry over a distance by early 1896. It is possible that he may have experimented with his set-up of recording instruments in conjunction with a Hertzian oscillator to note the effect of Hertzian waves. The remarks made in 1910 by Professor J. A. Fleming, M.A., D.Sc., at the University of London, seem conclusive enough to end speculation. It is noteworthy to add that Fleming was of neutral nationality and that the opinion came long before the present antagonism between East and West.

"Although the notion of using Hertzian waves for telegraphy had been suggested, no one had overcome the practical difficulties, or actually given any exhibition in public of the transmission of intelligence by this means. The appliances in certain elementary form existed, and the advantages and possibilities of electric wave telegraphy had been pointed out, but no one had yet conquered the real practical difficulties and exhibited the process in actual operation."[36]

The day was soon to dawn, however, when the world would awaken to the introduction and reality of wireless communication through the agency of a brilliant Italian—Guglielmo Marconi.

(To be continued)

[28] Sir William Crookes produced the instrument which subsequently produced Rontgen rays. Fleming: op. cit., p.513.

[29] Fleming: op. cit., p.514.

[30] Ibid., p.420.

[31] The name "coherer" was bestowed by Sir Oliver Lodge in 1894. Fleming: op. cit., p.514.

[32] Delivered in the Royal Institution, London.

[33] J. A. Fleming quotes three eminent men who gave the matter much consideration, among them a captain in the Royal Navy—Admiral Sir H. B. Jackson—who later pioneered the use of wireless in the British Navy and did much to lay the foundation for the study of electro-magnetic wave propagation.

[34] Radio Day—7th May—is celebrated in Russia in commemoration of the day in 1895 that Popov was said to have given his demonstration. Levine, Irving R.: "The Real Russia"; Allen and Company, London, 1959.

[35] Fleming: op. cit., p.517.

[36] Ibid., p.518.

"The box kite certainly gets the antenna up in the air."

AUSTRALIAN DX CENTURY CLUB AWARD

OBJECTS

1.1 This Award was created in order to stimulate interest in working DX in Australia and to give successful applicants some tangible recognition of their achievements.

1.2 This Award, to be known as the "DX Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.

1.3 A certificate of the Award will be issued to the applicants who show proof of having contacted one hundred countries, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

2.1 Verifications are required from one hundred different countries as shown in the Official Countries List.

2.2 The Official Countries List will be published annually in "Amateur Radio" and will be amended from time to time as required. Should a country be deleted from the Countries List at any time, members and intending members will be credited with such country if the date of contact was before such deletion.

2.3 The commencing date for the Award is 1st January 1946. All contacts made on or after this date may be included.

OPERATION

3.1 Contacts must be made in the H.F. Band (Band 7) which extends from 3 to 30 Mc., but such contacts must only be made in the authorised Amateur Bands in Band 7.

3.2 All contacts must be two-way contacts on the same band. Cross band contacts will not be allowed.

3.3 Contacts may be made using any authorised type of emission for the band concerned.

3.4 Credit may only be claimed for contacts with stations using regularly-assigned Government call signs for the country concerned.

3.5 Contacts made with ship or aircraft stations will not be allowed, but land-mobile stations may be claimed provided their specific location at the time of contact is clearly shown on the vertification.

3.6 All stations must be contacted from the same call area by the applicant, although if the call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.

4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

4.4 A check list must accompany every application setting out the details for each claimed station in accordance with the details required in Rule 4.3.

APPLICATIONS

5.1 Applications for membership shall be addressed to the Awards Officer, Box 2611W, G.P.O., Melbourne, Vic., accompanied by the verifications and the check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

5.2 A nominal charge of 2/6, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

5.3 Successful applicants will be listed periodically in "Amateur Radio". Members of the D.X.C.C. wishing to have their verified country totals, over and above the one hundred necessary for membership, listed will notify these totals to the Awards Officer.

5.4 In all cases of dispute, the decision of the Awards Officer and two members of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN V.H.F. CENTURY CLUB AWARD

OBJECTS

1.1 This Award has been created in order to stimulate interest in the V.H.F. bands in Australia, and to give successful applicants some tangible recognition of their achievements.

1.2 This Award, to be known as the "V.H.F. Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.

1.3 Certificates of the Award will be issued to the applicants who show proof of having made one hundred contacts on the V.H.F. bands, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

2.1 Contacts must be made in the V.H.F. Band (Band 8) which extends from 30 to 300 Mc., but such contacts must only be made in the authorised Amateur Bands in Band 8.

2.2 In the case of the authorised bands between 30 and 100 Mc., verifications are required from one hundred different stations at least seventy of which must be Australian. The Amateur Bands 50 to 54 Mc. and 56 to 60 Mc. will be counted as one band for the purposes of the Award.

2.3 In the case of the authorised Amateur Band between 100 to 200 Mc. and any authorised band between 200 to 300 Mc., verifications from one hundred different stations for each band is required.

2.4 It is possible under these rules for one applicant to receive three certificates, one for each of the authorised Amateur Bands nominated in Rules 2.2 and 2.3.

2.5 The commencing date for the Award is 1st June, 1948. All contacts made on or after this date may be included.

OPERATION

3.1 All contacts must be two-way contacts on the same band, and cross band contacts will not be allowed.

3.2 Contacts may be made using any authorised type of emission for the band concerned.

3.3 Fixed stations may contact portable/mobile stations and vice versa, but portable/mobile station applicants must make their contacts from within the same call area.

3.4 Applicants, when operating either portable/mobile or fixed, may contact the same station licensee, but may not include both contacts for the same type of endorsement.

3.5 Applicants may only count one contact for a station worked as a limited licensee with a Z call sign who is subsequently contacted as a full A.O.C.P. holder.

3.6 All stations must be contacted from the same call area by the applicant, although if the applicant's call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.

4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

4.4 A check list must accompany every application setting out the following details:—

4.4.1 Applicant's name and call sign, and whether a member of the W.I.A. or not.

4.4.2 Band for which application is made, and whether special endorsement is involved.

4.4.3 Where applicable, the date of change of call sign and previous call sign.

4.4.4 Details of each contact as required by Rule 4.3.

4.4.5 The applicant's location at the time of each contact if portable/mobile operation is involved.

4.4.6 Any relevant details of any contact about which some doubt might exist.

APPLICATIONS

5.1 Applications for membership shall be addressed to the Awards Officer, Box 2611W, G.P.O., Melbourne, Vic., accompanied by the verifications and the check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

5.2 A nominal charge of 2/6, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

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5.4 In all cases of dispute, the decision of the Awards Officer and two members of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN D.X.C.C. COUNTRIES LIST

	Phone	C.W.
AC3 .... Sikkim		
AC4 .... Tibet		
AC5 .... Bhutan		
AP .... East Pakistan		
AP .... West Pakistan		
BV (C3) .... Formosa		
BY (C) .... China		
C9 (prior 1/1/64) .... Manchuria		
CE .... Chile		
CE9, KC4, LU-Z, VK0, VP8, ZL5 etc., Antarctica		
CE0A .... Easter I.		
CE0Z .... J. Fernandez Arch.		
CM, CO .... Cuba		
CN2 (prior 1/7/60) .... Tangier		
CN2, 8, 9 .... Morocco		
CP .... Bolivia		
CR4 .... Cape Verde Is.		
CR5 .... Portuguese Guinea		
CR5 .... Principe, Sao Thome		
CR6 .... Angola		
CR7 .... Mozambique		
CR8 (prior 1/1/62) .... Goa		
CR8 .... Port. Timor		
CR9 .... Macao		
CT1 .... Portugal		
CT2 .... Azores		
CT3 .... Madeira Is.		
CX .... Uruguay		
DJ, DL, DM .... Germany		
DU .... Philippine Is.		
EA .... Spain		
EA6 .... Balearic Is.		
EA8 .... Canary Is.		
EA9 .... Ifni		
EA9 .... Rio de Oro		
EA9 .... Spanish Morocco		
EA0 .... Spanish Guinea		
EI .... Rep. of Ireland		
EL .... Liberia		
EP, EQ .... Iran		
ET2 (prior 14/11/62) .... Eritrea		
ET2, 3 .... Ethiopia		
F .... France		
FB8 .... A'dam & St. Paul Is.		
FB8 .... Crozet Is.		
FB8 .... Kerguelen Is.		
FC .... Corsica		
*FF8 .... French West Africa		
TU2 (fr. 7/8/60) Ivory Coast R.		
TY2 (fr. 1/8/60) Dahomey Rep.		
TZ2 (from 20/6/60) .. Mali Rep.		
XT2 (from 5/8/60) Voltaic Rep.		
5U7 (from 3/8/60) Niger Rep.		
5T5 (from 20/6/60) Mauritania		
6W8 (fr. 20/6/60) Senegal Rep.		
FG7 .... Guadeloupe		
FH8 .... Comoro Is.		
....		

	Phone	C.W.
FI8 (pr'r 20/7/55) Fr. Indo China		
FK8 .... New Caledonia		
FL8 .... Fr. Somaliland		
FM7 .... Martinique		
FN (prior 1/11/54) French India		
FO8 .... Clipperton I.		
FO8 .... Fr. Oceania		
FP8 .... St. Pierre & Miq. Is.		
*FQ8 .... Fr. Equatorial Africa		
TL8 (fr. 13/8/60) Cen. Afric. R.		
TN8 (from 15/8/60) Congo Rep.		
TR8 (from 17/8/60) Gabon Rep.		
TT8 (from 11/8/60) Chad Rep.		
FR7 (from 25/6/60) .. Glorioso I.		
FR7 (from 25/6/60) Juan de Nova and Europa Is.		
FR7 .... Reunion I.		
FR7 .... Tromelin Is.		
FS7 .... Saint Martin		
FU8, YJ1 .... New Hebrides		
FW8 .... Wallis & Futuna Is.		
FY7 .... Fr. Guiana & Inini		
G .... England		
GC .... Guernsey and Deps.		
GC .... Jersey I.		
GD .... Isle of Man		
GI .... Northern Ireland		
GM .... Scotland		
GW .... Wales		
HA .... Hungary		
HB .... Switzerland		
HC .... Ecuador		
HC8 .... Galapagos Is.		
HB0 (HE) .... Liechtenstein		
HH .... Haiti		
HI .... Dominican Rep.		
HK .... Colombia		
HK0 .... Arch. of San Andres and Providencia		
HK0 .... Bajo Nuevo		
HK0 .... Malpelo Is.		
HL, HM, 6N5 .... Korea		
HP .... Panama		
HR .... Honduras		
HS .... Thailand		
HV .... Vatican		
HZ (see 7Z)		
I1, IT1 .... Italy		
I1 (prior 1/4/57) .... Trieste		
I5 (prior 1/7/60) .. It. Somaliland		
IS1 .... Sardinia		
JA, KA .... Japan		
JT1 .... Mongolia		
JY .... Jordan		
JZ0 (pr'r 1/5/63) W. New Guinea		
K, W .... U.S.A.		
KA0, KG6I .. Bonin & Volcano Is.		
....		

* Fr. West Africa and Fr. Equatorial Africa: Only contacts dated prior to when the particular area obtained separate listing (as shown) will count.

	Phone	C.W.
KB6 .... Baker, Howland and Am. Phoenix I. (inc. Canton I.)		
KC4 .... Navassa I.		
KC6 .... Eastern Caroline Is.		
KC6 .... Western Caroline Is.		
KG4 .... Guantanamo Bay		
KG6 .... Guam		
KG6 .... Marcus I.		
KG6 (Rota, Tinian, Saipan, etc.) Mariana Is.		
KH6 .... Hawaiian Is.		
KH6 .... Kure I.		
KJ6 .... Johnston I.		
KL7 .... Alaska		
KM6 .... Midway Is.		
KP4 .... Puerto Rico		
KP6 .... Palmyra Group, Jarvis I.		
KR6 .... Ryukyu Is.		
KS4B Ser'na Bank & Roncad Cay		
KS4 .... Swan Is.		
KS6 .... American Samoa		
KV4 .... Virgin Is.		
KW6 .... Wake I.		
KX6 .... Marshall Is.		
KZ5 .... Canal Zone		
LA .... Bouvet I.		
LA .... Jan Mayen		
LA .... Norway		
LA .... Svalbard		
LU .... Argentina		
LX .... Luxembourg		
LZ .... Bulgaria		
MP4 .... Bahrein		
MP4 .... Qatar		
MP4 .... Trucial Oman		
OA .... Peru		
OD5 .... Lebanon		
OE .... Austria		
OH .... Finland		
OH0 .... Aland Is.		
OK .... Czechoslovakia		
ON4 .... Belgium		
OX, KG1 .... Greenland		
OY .... Faeroes		
OZ .... Denmark		
PA0, PI1 .... Netherlands		
PJ .... Neth. West Indies		
PJ2M .... Sint Maarten		
PK (from 1/5/63) .. .... Indonesia		
PK1, 2, 3 (prior 1/5/63) .... Java		
PK4 (prior 1/5/63) .... .. Sumatra		
PK5 (prior 1/5/63) .... Borneo		
PK6 (prior 1/5/63) Celebes and Molucca Is.		
PX .... Andorra		
PY .... Brazil		
PY0 .... Fernando de Noronha		
PY0 .. Trindade & Martin Vaz Is.		
PZ1 .... Netherlands Guiana		
SL, SM .... Sweden		
SP .... Poland		
....		

	Phone	C.W.
ST2 .... Sudan		
SU .... Egypt		
SV .... Crete		
SV .... Dodecanese		
SV .... Greece		
TA .... Turkey		
TF .... Iceland		
TG .... Guatemala		
TI .... Costa Rica		
TI9 .... Cocos I.		
TJ (FE8) .... Cameroon Rep.		
TL, TN, TR, TT (see after FQ8)		
TS (3V8) .... Tunisia		
TU, TY, TZ (see after FF8)		
UA1-6, UN1 .... .. Eur. R.S.F.S.R.		
UA1 .... Franz Josef Land		
UA2 .... Kaliningrad Region		
UA9, 0 .... Asiatic R.S.F.S.R.		
UA0 (prior 1/9/60) .. Wrangel I.		
UB5 .... Ukraine		
UC2 .... White Russian S.S.R.		
UD6 .... Azerbaijan		
UF6 .... Georgia		
UG6 .... Armenia		
UH8 .... Turkoman		
UI8 .... Uzbek		
UJ8 .... Tadzhik		
UL7 .... Kazakh		
UM8 .... Kirghiz		
UN1 (prior 1/7/60) Kar-Fin.Rep.		
UO5 .... Moldavia		
UP2 .... Lithuania		
UQ2 .... Latvia		
UR2 .... Estonia		
VE, VO .... Canada		
VK .... Australia		
VK2 .... Lord Howe Is.		
VK4 .... Willis Is.		
VK9 .... Christmas I.		
VK9 .... Cocos Is.		
VK9 .... Nauru I.		
VK9 .... Norfolk I.		
VK9 .... Papua Terr.		
VK9 .... Terr. of New Guinea		
VK0 .... Heard I.		
VK0 .... Macquarie I.		
VO (prior 1/4/49) .... Newf./Lab.		
VP1 .... British Honduras		
‡VP2 (prior 1/6/58) Leeward Is.		
VP2 .... Anguilla		
VP2 .... Antigua, Barbuda		
VP2 .... Br. Virgin Is.		
VP2 .... Montserrat		
VP2 .... St. Kitts, Nevis		
‡VP2 (prior 1/6/58) Windw'd Is.		
VP2 .... Dominica		
VP2 .... Grenada & Deps.		
VP2 .... St. Lucia		
VP2 .... St. Vincent & Deps.		
VP3 .... British Guiana		
VP4 .... Trinidad & Tobago		
....		

‡ One contact with each group formerly known as "Leeward Is." and "Windward Is." dated prior to 1/6/58 may be credited, in which case no further credit as a separate listing, as from 1/6/58, will be given those particular islands.

	Phone	C.W.
VP5 .... Cayman Is.		
VP5 .... Turks & Caicos Is.		
VP6 .... Barbados		
VP7 .... Bahama Is.		
VP8 .... Falkland Is.		
VP8, LU-Z .... South Georgia		
VP8, LU-Z .... South Orkney Is.		
VP8, LU-Z .. South Sandwich Is.		
VP8, LU-Z, CE9 .... Sth. Shet. Is.		
VP9 .... Bermuda Is.		
VQ6 (prior 1/7/60) Br. Somalil'd		
VQ8 .... .. Cargados Carajos Shs.		
VQ8 .... Chagos Is.		
VQ8 .... Mauritius		
VQ8 .... Rodriguez I.		
VQ9 .... Aldabra Is.		
VQ9 .... Seychelles		
VR1 (includ. Canton Is.) British Phoenix Is.		
VR1 Gilbert & Ellice Is., Ocean Is.		
VR2 .... Fiji Is.		
VR3 .... Fanning & Christmas Is.		
VR4 .... Solomon Is.		
VR5 .... Tonga Is.		
VR6 .... Pitcairn I.		
VS1 (prior 16/9/63) .. Singapore		
VS4, ZC5 (from 16/9/63) East Malaysia		
VS4 (prior 16/9/63) .... Sarawak		
VS5 .... Brunei		
VS6 .... Hong Kong		
VS9 .... Aden & Socotra		
VS9 .... Kamaran Is.		
VS9 .... Kuria Muria		
VS9 .... Maldive Is.		
VS9 .... Sultanate of Oman		
VU2 .... India		
VU.... .... Laccadive Is.		
VU .... Andaman & Nicobar Is.		
XE, XF .... Mexico		
XE4 .... Revilla Gigedo		
XT2 (see after FF8)		
XU .... Cambodia		
XW8 .... Laos		
XZ2 .... Burma		
YA .... Afghanistan		
YI .... Iraq		
YK .... Syria		
YN, YN0 .... Nicaragua		
YO .... Roumania		
YS .... Salvador		
YU .... Yugoslavia		
YV .... Venezuela		
YV0 .... Aves I.		
ZA .... Albania		
ZB1 .... Malta		
ZB2 .... Gibraltar		
ZC5 (pr. 16/9/63) Br. Nth. Borneo		
ZC6 .... Palestine		
ZD3 .... Gambia		
ZD4 (pr. 5/3/57) Gold Coast, Togo.		
ZD7 .... St. Helena		
ZD8 .... Ascension Is.		
ZD9 T. da Cunha and Gough Is.		
ZE .... Southern Rhodesia		
ZK1 .... Cook Is.		
ZK1 .... Manihiki Is.		
ZK2 .... Niue		
ZL .... Chatham Is.		
ZL .... New Zealand		
ZL1 .... Kermadec Is.		
ZL4 .. Auckland and Campbell Is.		
ZM7 .... Tokelaus		
ZP .... Paraguay		
ZS1, 2, 4, 5, 6 .... Rep. of S. Africa		
ZS2 .... Prince Ed. and Marion I.		
ZS3 .... South-West Africa		
ZS7 .... Swaziland		
ZS8 .... Basutoland		
ZS9 .... Bechuanaland		
3A .... Monaco		
3W8, XV5 .... Vietnam		
4S7 .... Ceylon		
4U1 .... I.T.U. Geneva		
4W1 .... Yemen		
4X4 (from 14/5/48) .... Israel		
5A .... Libya		
5B4 .... Cyprus		
5H1 (VQ1) .... Zanzibar		
5H3 .... Tanganyika		
5N2 .... Nigeria		
5R8 .... (Madagascar) Malagasy		
5T5, 5U7 (see after FF8)		
5V .... Togolese Rep.		
5W1 (ZM6) .... Samoa		
5X5 (VQ5) .... Uganda		
5Z4 (VQ4) .... Kenya		
6N5 (see HL)		
6O1, 6O2 (fm. 1/7/60) Somalia R.		
6W8 (see after FF8)		
6Y (VP5) .... Jamaica		
7G1 (from 1/10/58) Rp. of Guinea		
7Q7 (ZD6, Nyasaland) .... Malawi		
7X2 (FA) .... Algeria		
7Z (HZ) .... Saudi Arabia		
8Z4 .... .. Saudi Arabia-Iraq N.Z.		
8Z5 (9K3) Saudi Ar.-Kuwait N.Z.		
9A (MI) .... San Marino		
9G1 (from 5/3/57) .... Ghana		
9J (VQ2, N. Rhod.) .... Zambia		
9K2 .... Kuwait		
9K3 .. Kuwait-Saudi Arabia N.Z.		
9L1 (ZD1) .... Sierra Leone		
9M2, 9M4 (VS1) (from 16/9/63) West Malaysia		
9N1 .... Nepal		
9Q5 (pr. OQ5-0) R. of The Congo		
9S4 (prior 1/4/57) .... Saar		
9U5 (from 1/7/60 to 30/6/62) Ruanda-Urundi		
9U5 (from 1/7/62) .... .. Burundi		
9X5 (from 1/7/62) .. Rwanda Rep.		
— .... Cambodia		

LASERS*

BY STANLEY LEINWOLL†

Part 1—Introduction to the Communications Mode of the Future: Lasers.

THROUGHOUT the history of radio communication, amateur and professional scientists alike have been striving to broaden the spectrum of usable frequencies. In the early days of radio, control of the spectrum was limited to the kilocycle range. Then gradually this control extended first to the megacycle region, then to kilomegacycle ranges.

The object of this expansion has not only been to apply communications engineering techniques to as much of the electromagnetic spectrum as possible. It was also intended to reap the rewards of increased bandwidth, since the number of users has been increasing more rapidly than the amount of usable spectrum space.

Over the past generation, electron tubes, klystrons, magnetrons, transistors, and other semi-conductor devices have been developed and refined to the point where generation of carrier waves in the vicinity of 1 millimetre, or a frequency of 300,000 megacycles, was possible. At millimetre wavelengths, however, it became painfully apparent that the practical upper limit of frequencies that could be generated and used by using conventional methods had been reached. The construction of miniature resonant cavities as well as extremely small waveguides made the production of higher frequencies by known techniques an impossibility.

Then, in 1960, a scientist named Theodore Maiman, working for Hughes Aircraft Corp., succeeded in producing a beam of pure red light, at a single frequency. What made Maiman's discovery so remarkable was that the light produced was coherent—it was in phase, and the beam was nearly parallel. Maiman's device, which was called a laser, or optical maser, was different from other conventional generators of light. Light sources such as tungsten lamps, fluorescent bulbs, and even so-called monochromatic sources like sodium vapor lamps, produced a wide band of frequencies which were, in addition, out of phase, of different amplitudes, and of different polarisation. Such light is called incoherent.

In radio terms, the laser was comparable to an oscillator or frequency generator, while conventional light sources were the equivalent of noise generators. While it was impossible to modulate the latter, there was a definite possibility of modulating a coherent light beam.

Until the development of this remarkable device, it had not been possible to generate frequencies above about 300 kilomegacycles. Then suddenly, in one step, more potential spectrum space was made available than in all other bands combined. Fig. 1 shows the electromagnetic spectrum.

From this figure it can be seen that wavelengths in the visible and infrared range run from 4,000 to 7,000 angstrom units, where one angstrom unit is equal to 10^{-8} centimetres (0.00000001 cm.). Since the velocity of light is equal to frequency times wavelength, we can solve for the frequency by substituting the speed of light, 300,000 metres/second. On solving for frequencies in this part of the spectrum we find a range varying from 430 to 750 **million megacycles per second.**

When we consider that at present the total available spectrum is under 200,000 megacycles, the implications stagger the imagination! For example, if only one per cent. of the spectrum could be used for Amateur communications, there would be made available 3 million megacycles of spectrum space. This is fifteen times the total now available in all parts of the spectrum. Assuming about 300,000 Amateurs in the world, it would mean enough space to assign every Amateur his own personal 10 Kc. channel!

At the present time laser devices can produce coherent radiation in a portion of the visible spectrum as well as at a number of wavelengths in the infra-red region of the spectrum. The number of frequencies at which optical masers have been producing coherent radiation has been increasing rapidly, however, and there is every reason to believe that the range will continue to increase.

★

Fig. 1.

The electromagnetic spectrum. The laser produces coherent radiation in the microwave and visible portions of the spectrum.

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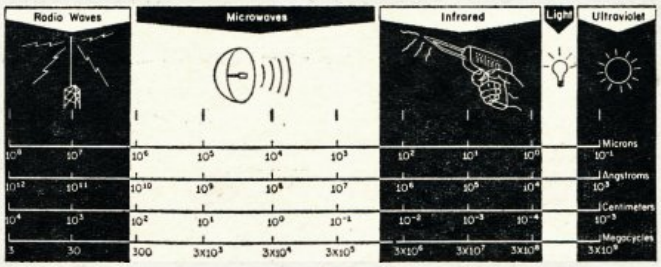

COMMUNICATION APPLICATIONS

In the four years since the announcement of the first working laser more than 500 laboratories in this country alone have joined in laser research. Toward the end of last year a television picture was transmitted using a beam of laser light as the carrier. Other laser beams have been used successfully in short range experimental communications systems, and several months ago I.B.M. was awarded a contract by N.A.S.A. to build and test a laser space communications system.

This remarkable device has also seen applications in the fields of medicine, in industry, in science, and by the military establishment. The most revolutionary possibilities, however, are in the field of communications. From this point of view alone the optical maser is one of the most exciting inventions of the century. It has been compared in its potential impact on communications with the vacuum tube and the transistor. It could turn out to be even more important than both!

Many Amateurs have been asking for more information about lasers. What are they? How do they work? What do they mean to the Amateur community at present and what will they mean in the future? This article will attempt to answer these questions.

ATOMS AND ENERGY

The production of laser light involves an entirely new concept in electromagnetic radiation. Whereas electronics had previously limited itself to the control and use of the energy of free electrons that moved about from one atom to another, the laser utilises energy states **within** atoms themselves to produce electromagnetic waves.

In order to understand how electromagnetic radiation can be generated as well as amplified sub-atomically, it is desirable to describe briefly the modern picture of radiation from within atoms and molecules.

ENERGY LEVELS

Every atomic system, whether it is an individual atom, a molecule, a crystal, or some other configuration, has associated with it certain characteristic energy levels.

Ordinarily, the systems are at rest, at their lowest, or ground state energy level. They can, however, absorb energy which raises them to an excited state. It should be mentioned that the excited state is not the natural state of any atomic system, and that it will tend to return to ground level, doing so in the easiest possible manner. Every atomic system can absorb specific, discrete amounts of energy which are unique to that system.

These discrete energy units are most often referred to as **photons**. They can be thought of as minute bundles or packets of energy which exhibit both the characteristics of matter as well as of electromagnetic radiation travelling with the speed of light.

This model of atomic systems is part of a fundamental theory of matter—The Quantum Theory. It has been successful in explaining atomic phenomena which had not been understood previously. According to this theory, the energy level to which an excited atomic system is raised is proportional to the frequency of the photon that is absorbed by the system.

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* Reprinted from "CQ," August, 1964.

† Radio Frequency and Propagation Manager, Radio Free Europe.

Figs. 2A to 2C show what happens when an atom, initially in the ground state, absorbs a photon. The atom, initially at its lowest energy level, Fig. 2A, is excited by an incoming photon of the right frequency, Fig. 2B. One of the electrons, which orbit the nucleus the way the planets in our solar system orbit the sun, jumps to a higher energy level.

Once the electron has been excited, a number of things can happen to restore it to its original level. The most common way for the atom to return to ground level is for it to emit a photon of the same frequency at which a photon was absorbed, as shown in Fig. 2C. This occurs spontaneously, and can take less than a microsecond from the time the photon was first absorbed. It is also possible for the atom to drop to an intermediate energy level by losing some of its energy in the material by collision. From this intermediate level often referred to as the metastable state it can emit a photon of a lower frequency. This is so because the energy to which an atom is raised is proportional to the frequency of the emitted photon.

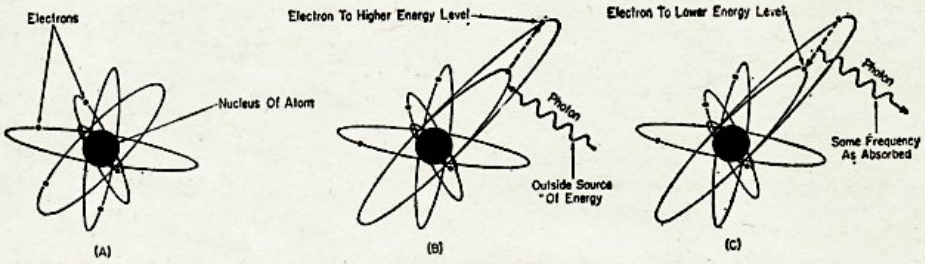

Fig. 2.—The series above show how an orbiting electron may be excited by an outside source of energy, the photon. In (B) electrons are in higher energy level by the absorption of the photon. To return to a lower energy level the electron emits a photon of the same frequency as absorbed.

In general, the time it takes for spontaneous photon emission to occur depends on the frequency of the incident wave, and there on the energy level to which the excited atom has been raised.

At values of frequency which correspond to the portion of the spectrum in the infra-red and visible ranges, spontaneous emission is extremely rapid. As the frequency decreases, excited energy states also decreases, and the time spent in the higher energy level increases.

There is another way for the excited atoms to be returned to ground level states. If, while the atom is in the excited state a photon of the proper frequency strikes the atom, it will emit a photon and return to its normal energy level. This is of fundamental importance, since it leads to a completely revolutionary method of amplifying electromagnetic radiation. A photon of the proper frequency striking an excited atom gives rise to the release of a second photon. This second photon is exactly in phase with the first photon, and travels in the same direction. One photon entered the system and two emerged. Microwave amplification has been accomplished!

In 1958, a historic scientific paper by A. L. Schawlow and C. H. Townes proposed a method of constructing a device that would produce coherent radiation at **optical** wavelengths by using a resonant cavity whose dimensions were millions of times the wavelength of light.

Schawlow and Townes proposed a device made of some fluorescing material with two small mirrors on either side of it facing each other. They theorised that a photon travelling within the mirrored device would interact with other energised atoms to emit other photons. In cases where the photons travelled perpendicular to the plane of the mirrors the wave would strike the mirror and be reflected back into the system, toward the other mirror.

With each succeeding passage of the wave it would grow in intensity until it were strong enough to burst through one of the mirrors as a flash of coherent light (see Fig. 3). In the Schawlow-Townes model it was proposed that one of the mirrors be made semi-transparent to facilitate the maser output. Laboratories throughout the country immediately began intensive research aimed at developing an optical maser.

In July 1960 the first announcement of success was made by T. H. Maiman, of the Hughes Aircraft Co., and before the end of the year five materials had been successfully tested in different laboratories. All used the principle of reflecting end mirrors proposed by Townes and Schawlow.

THE RUBY LASER

Maiman's laser used a ruby crystal. The amount of chromium in the aluminium oxide determines the color of the ruby. In Maiman's laser the ruby was "doped" with about 0.05 per cent. of chromium which gave the crystal a light pink hue.

The pumping source for Maiman's ruby was an electronic flash lamp. Chromium atoms are particularly responsive to light having a wavelength of 5,600 angstrom units in the blue-green part of the spectrum. Most flash-lamps are able to supply energy in this range.

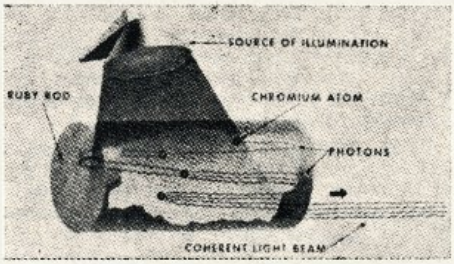

Fig. 3.—This drawing illustrates the build up in intensity as the photons travel between the mirrored surfaces until the beam is strong enough to burst through one of the ends as a coherent light beam.

Once chromium atoms have been excited to an upper energy level, they require two steps to return to their ground state. This is shown in Fig. 4.

There is first an initial drop in energy, as shown. This is a relatively small step and results primarily in heating the crystal lattice. The atom is then at an energy level at which it can remain for several milliseconds, a relatively long time as energy levels go. For this reason, this state, E_i in the diagram, is called the metastable state. Unless the excited atom is stimulated to do so sooner, it will return to its ground state by emitting a photon at a wavelength of 6,943 angstrom units at room temperature. This is in the red region of the electromagnetic spectrum and accounts for the red fluorescent glow of ruby as well as the characteristic color of ruby laser light. This phenomenon is also indicated in the figure.

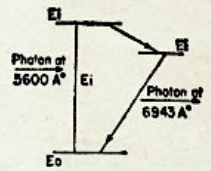

Fig. 4.—Energy level diagram for chromium. A photon at 5,600 angstrom units rises the level from Eo to Ei. The photons give up some energy to the crystal lattice by dropping to Ei, a metastable state where they remain several milliseconds. Decay to Eo, the ground level, from Ei, results in the emission of a photon in the red portion of the spectrum either spontaneously or by interaction with another photon.

POPULATION INVERSION

When the flash lamp first begins to pump light most of the chromium atoms are in the ground state, E_o. Continued optical pumping raises most of the chromium atoms to their upper energy levels at E_i, from which they immediately begin to drop spontaneously to the metastable state.

From the metastable state the atoms begin to emit photons at random and the ruby rod begins to glow red. The flash lamp continues to fire, feeding chromium atoms into the upper energy level. Then, at a particular point, the picture suddenly changes. It is the point at which the population of excited chromium atoms has been inverted and there are more chromium atoms at level E_i than there are at E_o. At this point, photons begin to interact with chromium atoms at level 1 to a significant extent. This results in stimulated emission of other identical photons and a cascade begins. Photons travelling parallel to the long axis of the crystal, which is several centimetres long and about ½ centimetre in diameter, will continue in the same direction until they strike the end of the crystal, where they are reflected back into the crystal.

Photons travelling in any direction other than this will pass out of the ruby. In the meantime, photons moving back and forth inside the crystal will continue to build until the intensity of the radiation is great enough, at which time some of it bursts through the end of

that face that is slightly transparent in a coherent pulse of light. This is shown in Fig. 3.

COHERENCE

Because a photon emitted by stimulation of another photon is in phase with the first, because the frequency of both is the same, and because both travel in the same direction, the beam emitted has space, time, and directional coherence. Coherence can be shown by repeating an experiment used in the early nineteenth century by Thomas Young to illustrate that light consisted of electromagnetic waves.

In this famous experiment light passes through a flat surface in which two small parallel slits have been cut. If light from one slit reaches a point on a screen behind it in phase with light from the second slit, there will be a brightening on the screen. If the light is not in phase, one source will cancel the other and there will be a dark area on the screen.

By placing two parallel slits directly against the surface of the ruby from which the light emerges, an interference pattern will appear. It has been found that this interference pattern is in very close agreement with what has been theoretically calculated assuming a plane wave that is perfectly coherent emerging from the two slits.

CONTINUOUS OPERATION

Xenon flash tubes are most frequently used to pump ruby lasers. These emit intense pulses of light which last about one half to two milliseconds. Laser output at room temperature is of somewhat shorter duration than this, running from about one to two milliseconds.

Because of heating effects, it is not possible to operate a ruby laser continuously at room temperature without damaging the crystal. In 1962 Bell Laboratories announced the development of a ruby laser that would operate continuously. This was made possible by using a new method of pumping, and by operating the laser at liquid nitrogen temperatures (about 200° below 0°C.).

OTHER LASER MATERIALS

Since Maiman's first ruby laser in 1960, other materials have been used successfully to obtain laser action. Among these have been calcium fluoride, calcium tungstate, and even glass, as host materials. In addition to chromium, dopants used have included neodymium, dysprosium, and uranium.

The only solid-state laser to operate continuously at room temperatures was announced several years ago by Bell Laboratories. It is a calcium tungstate-neodymium doped crystal. Output power is very low.

Ruby is still the most widely used material, and most laboratories currently doing solid state optically pumped laser research use the ruby crystal.

(To be continued)

AMATEUR FREQUENCIES:
USE THEM OR LOSE THEM!

ENQUIRIES INTO PORT PIRIE T.V. RECEPTION

Hams Say They Are In The Clear

Following are extracts taken from Port Pirie's (South Australia) "The Recorder."

"Because of complaints of Ham Radio broadcasts allegedly interfering with t.v. reception in Port Pirie, members of the Pirie Amateur Radio Club conducted secret tests in an endeavour to locate unauthorised operators.

"Each licensed operator voluntarily had his set sealed during the period of the investigation which lasted a full week. According to the club, the test proved that licensed Amateur operators were not responsible for excessive t.v. reception interference.

"All transmitters were sealed by the deputy town clerk, Mr. R. M. C. Mudge.

"The interference was of sufficient strength to cause many viewers to complain bitterly and to consult t.v. mechanics.

"Most complaints were levelled at Amateur operators and because of this it was decided to institute enquiries to find the cause of the interference.

"It was pointed out by a spokesman for Ham operators that their equipment was regularly inspected by officers from the Postmaster-General's Department.

"At Port Pirie an inspector from the Department addressed the club. The inspector told members that the P.M.G. could not undertake to remedy interference troubles experienced in this area which was not serviced by a particular t.v. station.

"The service area under the control of the P.M.G. extends from only 70-80 miles from the t.v. station."

The paper then goes on to give a lengthy explanation of t.v. and t.v.i. problems for the benefit of viewers in that district.

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cer. No.	C'ntries	Call	Cer. No.	C'ntries
VK5MS	24	306	VK2JZ	61	218
VK6RU	2	303	VK6KW	4	211
VK5AB	45	301	VK3WL	14	211
VK6MK	43	293	VK3ATN	26	204
VK3AHO	51	290	VK4HR	12	192
VK4FJ	21	280	VK4RW	23	186

C.W.

Call	Cer. No.	C'ntries	Call	Cer. No.	C'ntries
VK3KB	10	326	VK6RU	18	260
VK3CX	26	304	VK3AHQ	79	248
VK2QL	5	301	VK3ARX	66	242
VK4FJ	29	296	VK3XB	75	238
VK3NC	19	286	VK3YL	39	237
VK2AGH	71	267	VK2EO	2	234

New Member:

VK5KO	80	102

OPEN

Call	Cer. No.	C'ntries	Call	Cer. No.	C'ntries
VK6RU	8	309	VK3NC	77	287
VK4FJ	32	305	VK3HG	3	274
VK2ACX	6	300	VK3JA	43	252
VK2AGH	83	300	VK7LZ	23	242
VK6MK	74	295	VK2VN	18	235
VK3AHO	76	295	VK4HR	7	233

HAM RADIO "DOWN UNDER"

(Reprinted from R.S.G.B. Bulletin, Aug. 1964)

The first thing that strikes a UK immigrant or visitor to Australia who applies for a transmitting licence is the low annual fee of £1 Australian (equals 16/- sterling!). No extra charge is made for mobile operation, but prior permission must be sought for /P operation, whether from a temporary portable or alternative address.

For those already the holders of a current UK licence, or who held one until say six or seven weeks prior to arrival in Australia, issue of a new VK licence is a friendly formality.

If not yet in possession of a UK licence then the new arrival must sit a Radio Theory and Morse (15 w.p.m.) examination similar to the UK one. Without the Morse examination, however, permission may be obtained to work on the v.h.f. bands, telephony only, for which a special series of "Z" calls is allocated, e.g. VK5ZAA.

Operating

What a pleasure operating in Australia is. One is immediately made to feel at home among the thousands of VKs who hold licences.

The Australian operates in almost empty bands compared with the overcrowded conditions to be heard on any receiver in the Northern Hemisphere.

Furthermore, 150 watts is the maximum permitted power on all Amateur bands from 160 to 2 metres. Add to this the use of 6 mx (52 to 54 Mc.), plus a neighbourly tolerance of large aerial towers (many t.v. receivers in country areas have 57 ft. monsters); good sunny weather for eight months of each year, and the feeling of being a sought-after call sign if you work 14 and 21 Mc. DX. I can see some pre-war as well as post-war Gs booking on the next boat "down under" already!

Equipment Available

Most equipment is very dear by UK standards; for example, an Eddystone 888A would sell new for more than £200 and a good condition HRO for £80.

Luckily the Wireless Institute of Australia (equivalent to R.S.G.B.), through some of its State Divisional bodies, has been able to arrange trade price facilities with selected local distributors. Membership in the VK5 Division also entitles one to the first class disposal equipment arranged by the W.I.A. disposals sub-committee in South Australia at give-away prices.

Thus the usual tendency is towards "home brew" rigs or converted government surplus.

To visitors and intending immigrants alike, the Australian Department of Customs extends a very helpful hand. So, if you are bound for the land of the Southern Cross, take all you can afford so that you can sit back one balmy Australian evening and work those few Gs who are early risers.

In conclusion, the XYL and I would like to say 73 to all those VK5 Hams and their XYLs who made our three-year stay in their sunny land such a memorable one; maybe we will be amongst you again one day.

—A. G. Blackmore, G3FKO (ex-VK5II).

[VK5 Amateurs may now take a bow. Pansy excepted!—Editor "A.R."]

— • • • —

ERRATUM

In the article "An S.s.b. Transceiver for 52 Mc.," "A.R.," November 1964, some component values were omitted. Please refer to Fig. 21, Power Converter, on page 7.

D—OA210 or equivalent.
L—100 mH.
C1—8 μF., 600v.
C2—8 μF., 150v.

The W.I.A. has nearly 3,000 members. Wear the badge which proclaims **your** membership. You can buy it from your Divisional Secretary.

ANOTHER LOOK AT THE I.T.U. FUND

The following is an extract from "Info," the journal of the Elizabeth Amateur Radio Club. The editorial is written around the I.T.U. Fund. This is well put together, sensible, and a both-sided approach to the question; a little unusual in that so far all writings on the subject in our magazine and Divisional journals assume that there is not two sides to the subject.

"In the most recent issue of our South Australian W.I.A. journal, Hams were urged to contribute to the fund to finance a trip for a W.I.A. representative/observer to the forthcoming I.T.U. Conference in Switzerland. It was suggested that unless the Australian Hams were represented, then there was a strong possibility that we may lose more of our Amateur frequencies. It was inferred that unless we donated to the fund we probably would have no Ham Radio at all! The obvious lack of interest of members in giving to the fund indicates that some doubt exists as to whether this trip is really necessary.

"There appear to be three alternatives:—

1. It is advisable, as inferred, that a W.I.A. representative be present at Geneva to swing the balance of opinion of other representatives, and so preserve our frequencies,
2. The presence of our representative will have no effect on proceedings, or
3. It would be better not to send a representative.

"The first alternative has been well presented by more able pens—so successfully in fact that it may tend to be considered that there is no doubt that the trip is almost vital to our interests.

"On the second alternative, it must be asked why the W.I.A. is the only minor Amateur organisation to consider sending a representative. There are many organisations in countries with a much higher Ham population than ours who did not send a representative to the last Conference and, as far as is known, do not intend sending one to this one. Nor, apparently, has any suggestion been received from sister societies to share the cost of a common emissary.

"If, as reported, the main threat to Amateur frequencies is to come from newly independent countries interested in broadcast bands, is it seriously considered that the delegates from these countries will be influenced away from what they consider their needful rights by a representative from a country whose racial and political structure is so different from theirs, and which is already so powerfully active in short-wave propaganda broadcasting, particularly as our representative is to have no official standing? Surely any negotiations to be effective in this regard would need to be most delicately performed at a higher level.

"In fact, is not the third alternative a real one?

"It is probable that the real support for the Amateur cause at the Conference will come from three directions:—

(a) From the delegates of other communications interests who are themselves Amateurs.
(b) From the governments of those countries interested in Hams as potential defence operators.
(c) Indirectly, from those companies manufacturing Amateur equipment. (The setting up of 4U1ITU would seem to be a good one!)

"To return to the article in The Journal; perhaps it is not much good buying a new tube only to have to use it in the family radiogram. We should, however, consider other aspects of this representation before sending our money the same way as the last lot went."

Do you think this is food for thought? Write to "A.R." and let us know your views.

☆

AMENDMENT TO NATIONAL FIELD DAY CONTEST RULES

Readers are asked to note the following alteration to the Rules of the John Moyle Memorial National Field Day Contest, 1965.

Delete Rule 8 as published in Dec. 1964 "A.R.," and substitute:—

"8. The following shall constitute Call Areas: VK1, VK2, VK3, VK4, VK5, VK6, VK7, VK8, VK9, and VK0."

D X

VP4, OA4, BV, ZM7, 7GI, FP, AC5, MP4, ZC6, TY2

Sub-Editor: H. A. BEHENNA, VK5BB,
14 Stanley Street, Crystal Brook, South Aus.
ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB-EDITOR

Another year has slipped quietly by, possibly not a good year for radio communication as Amateurs are concerned. However, things are never as bad as they seem and most of the very keen boys are still jubilant at their results achieved on the Amateur frequencies. To those fellows who have kept plugging away under these slightly adverse conditions (as compared to those of some years back), might I say congrats. for the results attained. To those fellows who will not go on the air unless they can destroy the other fellow's speaker cone, how about pressing the switch a little more often? Now is the ideal time to make that resolution. Remember that things could be a lot worse, let's try to tolerate these weaker conditions and make the most of our excellent hobby Amateur Radio.

160 Metres: A little more activity on this band of late. A report from Chas. VR1B says that he has been hearing VKs 3BM and 3ATN with very good copy on s.s.b.

80 Metres: Most of the activity on 80 is from around 1000z when South America through Central to North America can be worked, depending on the QRM and QRN.

40 Metres: I have not listened in the early a.m. hours local time on this band, but it appears to be gaining in popularity, since the influx of s.s.b., later in the day it appears to be still following the habits of the previous few months and is, I think, on the improve.

20 Metres: Has gone a little erratic, especially during the early p.m. hours local time. However, when most of the Amateurs are able to go on in the evenings, the long path early in the evenings to Europe, etc., and a little later on the short path is generally open for a while and gives good signals. The number of a.m. stations on seems to indicate an improvement in these conditions also.

15 Metres: Activity is on the improve here for those who enjoy the contact with perhaps less QRM and quieter conditions. Unfortunately with this band, a lot of listening has to be done. Not two days in a row it is the same, and you can only go on 15 when it permits one to do so. There has been an occasional break-through to Europe in the evenings. The commercials on the high end are still a good pointer, but not always reliable. A possible falling off in activity here is that 40 metres, etc., can be worked with a dipole. T.v.i., etc., and some are adverse to erecting a beam when they can do it on the other bands much easier without the worry of the beam.

10 Metres: This has been open on odd occasions to the North, especially on week-ends, to JA and KR6 at excellent strength. Let's hope that it decides to open a little more often. If you are a fan of this band, stick at it, thereby creating activity on same, as activity is the only thing that will keep it open.

WHOM TO LOOK FOR AND WHERE

VP7BC is active from the Bahamas on 15 and 20 mx. He is American W4CNS and hopes to use this call sign for about six months.

WA4AYX likes working South Americans on phone, but finds the language barrier troublesome. He has learnt Spanish. He now gets plenty of contacts and the QSL returns are nothing short of excellent.

HB9EB is located on Utila Island, off the coast of Honduras. He is a Methodist missionary and with a power plant recently installed, he has added strength to his signal, to say nothing of the pile-ups.

XE2ZZZ is the call of Delia, 19-year-old daughter of XE2UB, and hails from Obregon in Mexico. She likes c.w. and favours 40 mx.

JA4AKI, operator Kiroshi from Japan, has a nice signal from his low power tx. He runs 16 watts to a 6146, thence to a ground plane antenna.

VP2KM active on 14 Mc. s.s.b. about 1300z. QTH is Basseterre on St. Kitts.

ZS2QK is not in South Africa as the call suggests, but is at Queen Maudsland, Antarctica, and is using c.w.

CE0AG, Easter Island, will be the DX-ers' Christmas present, thanks to George VE3DGX, now operating as VE0NM, aboard the H.M.C.S. Cape Scott, which left Halifax on Nov. 16. The ship is due at Easter Island on Dec. 12 where it will remain until Feb. 14, 1965. Ashore on the island, George will use the call CE0AG. Operation will be 60 per cent. s.s.b. and 40 per cent. c.w., using Hallicrafters-furnished equipment which includes two SR-150 transceivers. The antenna is a 14AVQ vertical supplied by Hy-Gain. QSL to George Hrischenko, VE-3DGX, 3156 Bruce Ave., South Windsor, Ontario, Canada.

KX6AJ has left Kwajalein and returned to U.S. where he can be contacted at W6GRZ. Whilst at Kwaj., he contacted over 3,000 Amateurs.

KG6SB is reported active on Sundays and Mondays (local) about 0800z.

BV1USA at Taiwan is operated by both military and civilian personnel. Spot freq. are 14050 kc. for c.w., 14307 for s.s.b. There are no individual licences available at Taiwan.

CE1DD, from Chile, is a YL operator by the name of Ursula, has been working some of the VKs on s.s.b. on 14 Mc. She can be heard most evenings.

FY7YF is on daily s.s.b. from French Guinea, S.A., on a freq. of 14105 kc., time approx. 1200z.

Some of the best Brazilian stations to look for at about 0600z would be PY2BGL, PY2BKO and PY1BTX.

KH6OY/KM6, Wake Island, reports that KW6ED disappeared on a Pacific flight last March. As he had his log book with him, none of his contacts can be verified.

VQ8BY, with a nice signal, is the call of Ralph Bird, located on Vacoas, Mauritus; runs 40 watts to a half wave dipole.

MP4BEQ says he is in the Shaikdom of Bahrein, Arabian Gulf. Operator is Steve Gibbs, known for his former call signs of 5A3CJ, GM3MBS; he is currently running 400 watts input.

UB5UN and UB5AR Tek are on the air quite regularly for those who desire a contact to this area. Both have good signals and are popular contacts.

KG6APJ also reports that he is listening on 6 mx for those interested. He transmits on a frequency of 50110.

A very informative letter from Chas. Hawker, VR1B, re the spurious frequencies from an essential service on 14355. These unwanted frequencies, which were falling in the Amateur band, have been cleaned up. Our thanks to those concerned. It makes for better listening. Chas' QTH is the Gilbert Islands in Western Pacific, where he says that 20 mx is the only reliable band and is his favourite. He works c.w. and s.s.b. Chas also says that he has been working a little MM as from VR1B/A and VR3H. (Thanks for the letter Chas.)

VR1B: C/o. Wireless Department, Betio, Tarawa, Gilbert Islands, West. Pacific.

From Comps VK5EF comes the information that at the time of writing there are approx. 530 Amateurs active on s.s.b. in VK. Comps is keeping a log of all these operators, so if you are going into s.s.b., make sure that your call sign is given to him at Gawler with the necessary details of the type of gear, etc.

Had a contact with Ross WB6DEX, ex-VK5AJ. David VK1ATR was visiting Ross and was leaving by air the next day for N.Y. He had an excellent trip over to the States and was thoroughly enjoying it all.

Les 3A2CP is workable on s.s.b. around 1400z, 14240 kc.

IT1TAI is also very active with a good signal from 141-14250 kc. s.s.b., 1230z.

VU2PP, one of the a.m. diehards, always puts in a very good signal on 14 Mc. in the a.m. portion.

Peter Drew, WIA-L6021, reports: Conditions here have improved greatly over the past month and I am hearing loads of DX on 20 and a little on 15. I have not listened to 160, 80 or 40 mx lately except for about 10 minutes on 40 at 1700 G.M.T. when I heard one weak G on c.w. 20 mx seems to be excellent almost round the clock, the worst period being in the middle of the day. The afternoons consist mainly of Far East and Pacific stations and then after about 1130 the Europeans, Middle East and Asia in general pour in with an occasional African. The Europeans usually last until about 17/1800 G.M.T. and then until about 2200 the band is usually excellent towards U.S.A. on the long path with a few West and South Africans still getting through. Of course the time is not very convenient for us, but it's worth losing a night's sleep to hear such good reception from U.S.A.

15 mx has been opening to Europe reasonably well most evenings up to about 1300 G.M.T., starting around 08-0900. Other than that, there is very little else on 15 except odd Africans around 09-1100 G.M.T., but they are not as regular as the Europeans.

10 mx: An odd JA during the middle of the day and KR6BF regularly, especially Sundays after 0300 G.M.T.

COUNTRIES AND ZONES WORKED

Another ever welcome letter from George VK5GG reveals the following stations worked on 14 Mc. s.s.b.: On short path, OK1ADP, G6DA, UA6FG, DL3WM, 4X4IX, OE8KI, IT-1ATI, UA6XG, YV1LH, UH8BO, DJ8RI, UJ-8KAA, G3FPQ, UR2AR, DU7SV, CE3CZ, DU1AN, I1TMG, OA1U, YV5BQ, VP4TI, G2FSP, LU9AM, CE0ZI/MM, LU6ES-MR, LU9DAH, EA1GH, EA1IO, I1FP, UB5ARTEK, OA4K, LU3AEF, LU4BAD, CX2CO, UW4HZ, UA4IF, I1ORS, OZ5BW, 5A1TW, VS5MH, UR2DW, 9N1MM, VK0GS, GD3GMH, 9K2AU. On long path, DL1SDC, PA0FX, UB5KAA, UB5UN, SM3BIZ, EA1GH, DJ4PR, SM4SB, DL2PO. George further reports that he now has DXCC on phone, c.w. and mixed, all zones are now confirmed for W.A.Z. May I be the first to extend the hand, George. Thanks for the letter and congrats. from all.

My thanks to John VK5LV also for the passing on of notes for this column, and note with interest that you will soon be adding to the s.b. QRM on 80, 40, 20 and 15.

Pete and myself have worked the following stations: W9NDA, WA6ZZK, W1PSK, ON5ZO, EP2BQ, LX1KPW, 9M4LQ, W6RSQ, WB6GVV, K4IEP, W7OMN, KH6FJL, DJ9EG, DJ9HQ/P, UA1WU, KR6KS, F2ZE, PA0DV, UB5KIX, UF6FN, K6EXO, W6JY, W6BHM, MP4TBJ, W4DPI, UJ8AA, and several more Ws all on s.s.b. on 14 Mc. On 15 mx Pete has worked many JAs on c.w.

QTHs OF INTEREST

4W1E—Via HB9ZN.
7Z3AA—Via MP4BDM.
7Z3AB—Box 2486, Dhahran, Saudi A.

And so at the close of 1964 may I take the opportunity of wishing one and all, all the best of good things. May 1965 be nothing short of a cracker year for everyone, hi! May we thank those mentioned hereunder for notes, etc., sent in during the year, all for the betterance of our magazine. The VK stations: 3TL, 3QV, 5RX, 5GG, 5FM, 3AKN, 4SS, 5WO, 5LV, 5ZK, 5ZC, 3BM, 5LD, Peter Drew, Hallicrafter Co. (U.S.A.) and many others who have had their names mentioned in this column. A very prosperous new year to you all. Lastly to the poor old printer—all the best for tolerating my crook typing. Bert, VK5BB.

☆

RICHARD M. WHITE, WA6HFU

Pictured above is Richard M. White, WA6HFU, who is located at 333 Lotus, Redlands, California. A keen user of the 21 Mc. band in the old days, every contact whether signals were S5 or S9, Dick was a good listener and first-class operator of his station.

Dick now has probably turned to the modern method of s.s.b. transmission. When on a.m. he uses the Valiant at 200 watts input, the receiver is NC300 and the antenna is a four element G4ZU beam. Another contact which has made Amateur Radio just that little bit more interesting.—Bert VK5BB.

V H F

52 - 144 - 420 - 576 - 1296 Mc.

Sub-Editor: LEN POYNTER, VK3ZGP,
14 Esther Court, Fawkner, N.15, Victoria
ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB-EDITOR

The introduction of Channel 0 in the Melbourne area and the news that 5A is a future allocation has forced our attention to the somewhat precarious position we are placed in operating so close to the t.v. channels.

Since Channel 0 commenced operating, numerous Amateurs have had unpleasant surprises to find themselves at loggerheads with their viewing neighbours and at times with the authorities. Due to the viewers' ignorance of the technical problems involved and their annoyance at having their programmes ruined by the "crank and his wireless," the average Amateur is somewhat overcome by the circumstances of his predicament and the result is often not becoming of either parties.

With this thought in mind, and the possibilities of being forced out of business, as it might imply, the VK3 V.h.f. Group Management Committee and V.h.f. Group have given considerable thought to how the whole business of t.v.i. can be tackled. At the November meeting of the Group it was decided to form a committee of responsible persons to give both technical and "diplomatic" service to the Amateur in trouble with t.v.i.

The plan is roughly as follows: The committee would consist of two Amateurs of professional standing with a more than average knowledge of both Amateur and television techniques, to assist in the diagnosis of the problem and the possible remedy; representatives of the t.v. service, preferably active Amateurs, who would know both sides of the problem; representatives of the Radio Inspection Branch, once again of Amateur group, who would assist in the other side of the negtiations and have the knowledge of both sides of the case.

Whilst this is only the beginning, further discussions will take place enabling a suitable programme to be made up and give the committee something concrete to build their foundations on. With a working committee then all the sides of the problem can be tackled. Both the Amateur and the viewer should receive the benefit of their work. This, we hope, will enable both parties to reach amicable agreements, taking into account all the factors likely to be involved, with the probable result that the viewer will receive interference-free reception and the Amateur can continue in business and preserve the usual domestic relationship in his neighbourhood.

With the summer months ahead and the usual bushfire danger becoming greater, many Amateurs through W.I.C.E.N. will be called upon to assist the various authorities in their task. To these Amateurs we offer our congratulations and trust that further service will be rendered to the community by their unselfish efforts. We ask other Amateurs who cannot, for various reasons, participate to ensure that the frequencies in use be kept clear for these emergency operations.

The question of net frequencies in the v.h.f. bands are very much alive at the moment. In particular, the 6 mx frequencies are under review in a number of Divisions and we trust that without any prejudice that other Divisions will follow and settle for a main calling net frequency of 53.032 Mc. QSOs between stations operating on this frequency in VK3 and VK4 have proved quite helpful in finding the openings on this band—apart from Channel 0 appearing. The use of ex-taxi two-way radios have produced some 50 odd call signs appearing on the net in VK3. If all Divisions accepted the freq., then Amateurs who are mobile away from home have a first class opportunity of reaching others in each capital city and we hope later in all main cities. With the aid of repeater stations, located at vantage points, it could be possible to communicate over long distances. This is quite the case in the U.S.

The VK3 Division has found a commercial source of crystals suitable for the net frequencies and of course the greater the use, that is the greater the number obtained from this source, the cheaper the price. These are first class crystals for the job. Any enquiries on this matter to Leo VK3ZGF, whose address will be found in the Call Book. If at least one freq. a.m. and f.m. in both the 6 and 2 mx bands are used Australia-wide, then we will have a universal calling frequency and in-built beacon for all to use.

The DX season has started on 6 and by the time you read this the Ross Hull Contest will be more than half way through. No matter how small your log, enter it into the contest and remember to be guided by the suggestion from the Contest Committee to comment on the suggestion that while the contest continues for the month that a log be entered for a period of say 7 or 9 consecutive days, thus allowing each to devote that period best suited to themselves to hop in and really have a go rather than chasing marathon efforts which discourages more and more each year.

73, best of DX for 1965, 3ZGP.

QUEENSLAND

In November the annual 6 mx DX season got off to a flying start with the band opening to VK5 on the first day of the month. Since then the band has been open to some State about half of the total number of days. On Tuesday, 24th Nov., the bands were open to all States at various times. Around 1400 the VK6s came in and about six of them were worked from VK4. It seems that "Channel Doughnut" is at last making itself useful. Whenever it is being heard up here strongly, then the VK3s in Melbourne may be heard. Many of the boys in VK4 are now tuning 53.032 Mc. looking for contacts.

George 4ZLG, who has been touring VK2, 3 and 7, has been worked while in VK3 and VK7. One VK4 station, calling on the VK3 net freq., found that George was the only station on the net at the time of the morning that the call was made. With the advent of TVQ0 here in Brisbane, it may be wise for the VK4s to get together and decide if a net frequency should be established. I did note a move in VK7 to have a net frequency, the same as VK3 have, namely 53.032. Should we also use the same frequency? TVQ0 has begun site preparations and the foundations for the mast are already in place. Late January is the expected date for the first test transmission from the station. Regular programmes should begin in June—just in time to blot out any winter DX!

A few have been heard on 6 mx who have been fairly silent for a few months. Alan 4ZAW and David 4ZDF are two who come to mind. Les 4ZZ has been working the stations on his 10 mx dipole.

Two metre activity here has not been very startling lately. Apart from the few regular QSOs, it is hard to get a contact on this band at the moment. Jack 4JE and Kev. 4ZR are using f.m. rigs on 53.187 Mc., but it is very hard for an a.m. station to break in on them. Have heard them talking television so we may hear them up even higher (or rather see them).

73, Peter 4ZPL.

WESTERN AUSTRALIA

The Vintage Car Club of W.A. had a rally on 15th and 16th Nov. Amateur Radio relayed check point times on the route to the overnight stop-over. We also got a mention in the "West Australian". Frequency used was 51.90 Mc. by special permission of the P.M.G. Tx's were netted over the previous fortnight. There were seven check points along the 60-mile route and about seven thousand cameras. An emergency occurred near Byford when a passing motor cyclist had a blowout and skated on his face for 20 yards. However, the 600-ohm proved sufficient to get the Armadale Ambulance.

The fox hunt the following week-end was a failure, only one hound turned up to find a fox with the news that he didn't want a run unless he had to. Since no reinforcements turned up, he didn't have to. The next fox hunt is at Narrogin on 5th Dec.

At the meeting on 23rd Nov., an exhaustive analysis was made of the training gear at D.C.A. There was a brief-case sized Collins s.s.b. tx and Cedric 6CD was heard muttering "where is it all?" I think Cedric's s.s.b. sounds just as good as any old Collins rig anyhow. After the inspection some strong coffee was downed. 73, 6ZAG.

New Kind of Convention

The New South Wales V.h.f. and T.v. Group will hold their first Three-Day V.h.f. Convention on **5th, 6th** and **7th March, 1965.** The programme will commence at 8 p.m. on Friday 5th at WI Centre, Crow's Nest. Bookings for accommodation can be arranged if desired. Programme and venue will follow in future issues.

S W L

Sub-Editor: Chas. Aberneathy, W1A-L2211
30 Urunga Parade, Miranda, N.S.W.

Well chaps, we start yet another year, and I trust that it shall be a happy and prosperous one for all. With all the exams. over and the holiday break over the festive season, I should be hearing from many members of their listening over that period.

VALVES

Diodes: The simplest combination of elements constituting an electron tube is the diode (di-ode means two electrodes). It consists of a cathode, which serves as an emitter of electrons, and a plate or anode surrounding the cathode, which acts as a collector of electrons. Both electrodes are enclosed in a highly evacuated envelope of glass or metal.

Triodes: In 1907 Lee De Forest added a third element—the control grid—between the cathode and the plate of a diode and so provided the resulting triode tube with the ability to amplify tiny radio signals. This led to the sensational development of radio communication, broadcasting and electronics in general. The control grid in this tube is a circular spiral of a number of turns of fine wire that completely surround the cathode.

Multi-electrode Tubes are tubes having more than one grid, which permits attaining many desirable characteristics not possible in a triode. Among the most common multi-electrode tubes are the Tetrodes, which have four electrodes (two grids) and the pentodes (which have five electrodes and three grids).

Tetrodes: The development of the Tetrode is a direct outcome of the undesirable grid-to-plate capacitance in Triodes. This capacitance leads to coupling effects and instability in r.f. amplifiers. The most effective answer to the feedback problem was to insert an additional shielding electrode, called a screened grid, between the control grid and the plate of a Triode. This additional grid almost completely encloses the plate and thus acts as an effective electrostatic shield between plate and control grid.

Pentodes: The insertion of an additional grid, called the suppressor grid, between the plate and the screened grid of a Tetrode overcomes the effect of second emission, and the resulting negative resistance at low plate voltage. By adding this electrode the tube becomes a five-electrode unit, or Pentode.

Beam Power: A beam power tube is a hybrid between a Tetrode and a Pentode. It has two grids like a Pentode, but it also has a special beam confining electrode, capable of overcoming the effects of second emission as does a Pentode.

Variable-Mu (remote cut off tube): This tube is a Pentode that has a gradual plate current cut off when the negative bias is increased. This is achieved by non-uniform spacing of the control grid wires, resulting in the amplification factor that is low at the centre and high at the ends of the grid structure. Thus the amplification of the tube may be changed by varying the grid bias.

NEW SOUTH WALES

During the past twelve months there has been a noticeable increase in activity amongst our members. The monthly meetings during that period were well attended and we were fortunate that on our meeting nights, that the VK2 Council were holding theirs. This gave us the opportunity to get rulings and decisions on various matters, which we thought should be finalised that way. Council members gave talks on our hobby, and were always ready to answer questions put to them by our members present. This was much appreciated and our thanks go to them for their assistance. We are hoping that 1965 will show even greater activity, give us your support, and try to come along to the meetings, held on the third Friday in the month.

Bruce L2283 lives at Kingswood and is a newcomer to the page. He uses an AMR300 rx with a half wave dipole on 20 and 40 metres for his antennae. Pleased to hear from you OM. Keep me posted on your doings.

Arnold L2291, on his s.w./b.c. rx, has logged ZE, OA4, CR7, HK4, VS9, ZP5 and PY3. This is really good considering the type of rx.

Ray L2287, using a 3.5 Command rx, a Q5'er, and a xtal converter logged OX3, HL, CR9, UI8, UH8, CR7, VP7, XW8, 4X4, 5A1, 9M4, CX, OH and PA0. Quite a nice variety OM.

Alan, of Dubbo, is awaiting his L number. Thanks for the letter OM, and I trust that you shall let me know of your doings in the near future.

Russell L2262: OK re those cards for 2AOH, shall do. Hope that you have an enjoyable holiday and pass those exams.

Mac L2075 has his 6 mx gear in operation and hopes the season is a good one; that makes two of us OM as I hope so as well. Those S.w.l's not on that band are missing a treat.

Sid L2258: I trust that you are feeling better now OM and that your holiday did you good. Many thanks for that article, which I shall use in the near future.

VICTORIA

The visit to GTV9 studios was well attended by the group who studied all the technical equipment necessary to produce the t.v. picture. Also during December we held our popular Christmas Party where food and drink vanished very quickly. The December radio construction night produced a flood of 52 Mc. converters for adjusting, we hope they will all produce a high score in the Ross Hull Contest. The first of the group's functions for 1965 will be the general meeting at 8 p.m. on 29th January.—Ian L3006

Greg L3138: Congrats. on being appointed to the committee of the Moorabbin Radio Club. Thanks for the Budapest Award rules. I shall use them at a later date. OK on your first on 52 Mc., we have had a few openings here also. QSLs received: 9M2, WA5, UA9, GI3 and UW3.

Eric L3042: To date this year (1964) Eric has sent 1,000 reports. Really, I do not know how he does it. During November, QSLs received were 26, stations heard: 160 mx 5, 80 mx 6, 40 mx 11, and 20 mx 27. Sorry for the abbreviations OM, but the space is limited and I know that you will understand.

Peter L3221: I see that you have the number at last. Could any member help Peter with a circuit of a transistorised receiver, as at his QTH a.c. is not available as yet. QTH: Peter Curran, P.O. Box 49, Piangil, Vic.

Noel L3101: Many thanks for your kind offer OM and we are looking forward to meeting Gwen and yourself during our visit to VK3 in January.

QUEENSLAND

What has gone wrong with our members in VK4? Has everyone got writer's cramp? No mail for two months; it's a poor show chaps. Still, it is up to you, as all I can do is complain.

SOUTH AUSTRALIA

It is my pleasure to report that we have yet another contributor from VK5-land. It is very gratifying to see members starting to co-operate in this way, as assistance is essential.

Tony L5073: Although using a modest type rx, Tony has heard some 60 countries, with 25 confirmations, which is not too bad for a start. Welcome to the page OM and I trust that you shall keep me posted on your doings.

Brenton L5069: I did not misplace your letter this month OM, hi. Pleased to hear that you are chairman for the new radio club at the Adelaide Teachers' College. Yes, the 6 mx band is interesting, you should have some good listening now that the v.h.f. season is on.

Alan L5065: I was wondering if you heard from the printer about those QSL cards? I asked him to forward particulars. QSLs received: VK1, IT, ZL and XE. Countries heard: GI, DL9, JA, TG9, FO8, VU, PJ, VQ, PY, XE, PA0 and K2.

Tim L5067: By the sound of things you are having a quiet time so far as listening is concerned. Still, I think we all get that way now and then. Latest log shows: VR2, VK0, I1, YV5, DU1, ZE7, ZLs and Ws. Sorry that I do not have a photo of myself or the shack. The R.D. results usually come out in the Dec. "A.R."

WESTERN AUSTRALIA

This month Peter is not alone as we now have four contributors in the W.A. section, and a welcome is extended to these newcomers and we trust that they shall continue to stay there.

Alan L6029: Using a Murphy 160 rx with a long wire antenna, he has logged some 70 countries with a return of 10 confirmations. Nice to hear from you Alan.

Geoffrey L6030: This lad is Alan L6029's brother, so naturally they share the same rx, and between them they have logged this month: KL7, WA0, VS9, ZS5, UW3, UA1, CR7, VQ8, G4 and VU2. Pleased to hear from you both, so keep writing.

Bryan L6028: Loggings for the month show: 15 mx, MP4, YO4, EP2, OH5, F9; 20 mx, XE1, LU8, PJ3, TG8, CT1 and VR4. I shall be glad to add you to the DX Ladder including the one W State.

Peter L6021: It must be a DX paradise over in W.A. by the tone of your letters OM, as you can always supply plenty. Best for the month are 25 real beauties, whilst the 15 QSLs received are equally as good. I trust that you eventually got those 100 reports away, hi. All the best in the "CQ" Contest.

SAFETY RULES

It is a basic principle of both electrical and general safety rules that all mains and apparatus must be regarded as being alive until proved dead.

The message which most of us are reluctant to accept is that by the time we are 30 years of age our reactions are slowing down. You can't put old heads on young shoulders they say, and maybe that is why nature has provided young people with quick reflexes. It is equally true that you can't put young reflexes into older people, and let's face it, by the time we are 30 years of age we are no longer young. The over 30's must, therefore, use the old heads that they should have acquired by that age. A message to the under 30's: Don't rely too much on your quick reflexes or you may never reach 30!

S.W.L. DX LADDER

	Countries Conf.	Countries Hrd.	Zones Conf.	W States
E. Trebilcock	285	293	40	50
P. Drew	148	252	34	31
D. Grantley	124	281	38	35
A. Westcott	97	159	31	11
M. Hilliard	91	241	33	14
G. Earl	76	151	32	10
R. Kearney	70	146	32	—
C.Aberneathy ..	64	104	33	14
N. Harrison	56	176	31	37
L. James	51	144	24	10
A. Raftery	29	132	15	6
R. Beckley	27	50	19	—
R. Oats	17	40	13	—
B. Prosser	10	136	6	1

YOUTH RADIO CLUBS

These notes will be brief (your scribe has had a dose of hospital) and the last for 1964. First priority is to wish all club leaders the best for the season and congratulate them, both for achievement (whether large or small) and for their spirit. I wish there were more like you.

We're happy in Canberra to have another 16-year-old who passed full A.O.C.P. His name is David Davies and he is in fourth year at Canberra Grammar. Lyneham could only give him a little help because he lived in the neighbourhood of some of our boys, so David has done a remarkable job. We'll have more details of his rig, etc., after the holidays.

News is scarce when you are away from communications, so I have only a letter from my regular helpful, Dave 3ZMX, and the VK4 Division Bulletin, which always includes Y.R.S. notes. (Sorry to inform you, 5PS, my old pal, that nobody in Adelaide honours me with even a line.) Dave sends me some very good VK3 items except for one sad one—Bill Allen, of Gowrie Park Y.R.C., is in hospital and very sick. You probably won't see this, Bill, but I've been in, and I'm out, so you join me as soon as you can. May be a photo in this issue of the boys at Korumburra, who earned the first Junior Certificates in VK3, said photo having been in the local paper. Wonthaggi Tech. have had a great burst of success with six Elementary and four Junior Certificates. Christian Brothers at Bundoora have applied for a licence and hope to be on the air in February. Have seen the P.M.G. publication, Applied Electricity I., mentioned in VK3 Newsletter, and it certainly is a good little course, from Electron Theory through Ohm's Law, Cells, Electromagnetism, Measurements, Capacitance, simple A.C. Theory, to the elements of Valve Theory.

VK4 continues to sail along with a helpful Council and a live-wire 4UC. Each VK4 Divisional Bulletin has a foolscap page of Y.R.S. notes showing a great lot of activity. New clubs at Yeronga High, Mt. Isa High, Redcliffe High, and Pomona Rural, and perhaps Christian Brothers at Gympie. News from Brian 9BJ of a move for a Y.R.C. at Rabaul when they finish their new shack. New club at Yeronga has 70 members and hopes to rope in Howard 4WO. Lots of interest in a display by Downlands College at the Industry and Hobby Fair. Gladstone Sea Scouts are keen to start a club and hope to be mobile marine, but can find no help as yet. Proserpine Scouts still stranded without help. Gympie Y.R.C. about to try some Junior Certificates and hope to be first in VK4. Some talk of Bundaberg having a Y.R.C. if help can be found.

A radio-happy New Year to you all. 73, Ken 1KM.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

PREPARING AN ANTENNA FOR JAMBOREE

Editor "A.R.," Dear Sir,

One night in September, I opened the front door to find the front porch and half the driveway full of Boy Scouts in uniform. They had come to take delivery of a 40 ft. mast I had promised them for use during the Jamboree-on-the-Air.

Their Scoutmaster told me afterwards how they managed to carry this thing 1½ miles to their hall. Half the Troop carried while the other half acted as advance or rear-guard, holding up the traffic at intersections and cheering the workers on at appropriate intervals. The duties were rotated.

The mast was duly delivered to the site and a working party erected it in the rain during the next week-end.

The following week-end it was lowered and re-erected because someone had forgotten to thread the halyard through.

The next week-end, under the proper supervision of a qualified Ham, a tri-band dipole was installed. This is the contraption written up in "A.R." some time ago using 80, 40 and 20 metre dipoles with a common 50-ohm co-ax. feeder, the feed point pulled to the top of the mast with the ends tied down at any old angle to various convenient points on the 10th Caulfield Scout Hall roof. It did not load too well at first, but with the encouragement of many well-wishers and the very real help of Dick VK3ADR and a few roof-climbing 10th Caulfield Scouters, we very smartly pruned the 80 and 40 metre dipoles to give us s.w.r's. close to unity. The 20 metre job needed lengthening but that presented no problems, even though no Ham antenna wire has ever before been subjected to such beautiful Scout knots.

With a reasonable match on all bands, the next thing to do was try it out. Well, try it out we did, our first contact with a W6 or so, quickly followed by a break-in from VK3DT portable at 10th Sandringham Scout Hall, who was doing the same as us. This worked out nicely because we were able to make a quick all-band check for each other, and then pack up content that the Jamboree-on-the-Air would be successful, for at least two Scout Troops.

Well it was a success for very many Scouts —and what a pleasure it was for me to work many VK stations operating portable at Scout Halls and to hear their antenna stories.

—Bob Slutzkin, VK3SK.

MOBILE SOCIETY

Editor "A.R.," Dear Sir,

I wonder whether your members know of the Amateur Radio Mobile Society, located in Great Britain. It is a fine organisation, and has done much to promote high operating standards and good fellowship among mobile (and other!) operators all over the world. Its monthly "News" is a remarkable publication, including everything from excellent technical construction articles to fascinating Letters to the Editor—some of which can be as controversial as those of "73" magazine.

I should very much like to recommend the Society to your members, mobile and otherwise. Subscriptions to the "News" are about A£1 per year, and I'm certain that they would send a free introductory copy if requested. The QTH is 95 Collinwood Gardens, Ilford, Essex, England.

—R. L. Gunther, W6THN/VK7.

N.C.D.X.C. AWARD RECEIVED

Editor "A.R.," Dear Sir,

Recently you published an article on the occasion of my obtaining the D.X.C.C. Award for 40 metre c.w.

As stated in my previous letter, I have concentrated mainly on 7 Mc. and one of the objects was to secure the N.C.D.X.C. Award (the Northern Californian Club) for this band.

The Award was for contacting 20 members of the Club and, in addition, 200 other W6 district stations. I have much pleasure in stating that this object has been attained and the Certificate is to hand.

As a boost to the 7 Mc. band, I am forwarding to you the Certificate and its accompanying letter, and trust you can find space to give them publicity. By now I had hoped to have had a photograph of the 220 QSL cards but was unable to do this as I have been on my back for the past month—as a matter of fact my pal Jim 5FO is writing this letter for me. I will do my best to have a photo in time for your publishing date but I would not rely on this. After you have made suitable blocks would you please return this "treasured possession."

—Ted Cawthron, OT26, VK5JE.

[Unfortunately publication dates prohibited printing a photo of the Certificate.—Ed.]

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Publications Committee Reports That . . .

Some readers overlooked the fact that this issue of "A.R." required all copy to be at Box 36 by the 1st December, and as the deadline was the 7th, all inwards mail received up to that date has been published or acknowledged in this issue. All mail received after the 7th December, 1964, will be held and not published unless requested by the sender.

Inwards mail was received from VKs 5JE, 5JT, R. W. Humphreys, R. L. Gunther, D. Parker, Ken Ashton and R. L. Erwin, and a technical article from VK5BI.

The cover price of "A.R." has been increased to 2/6 in an endeavour to combat rising costs. This will mean that the news-stand readers will now have to pay more for the copy of "A.R.," but members of the W.I.A. will not have to bear any increased charges. These will be met by the Division. Many facts could be put forward to explain why the increase was required, but no doubt readers are fully aware that their purchasing power is steadily being reduced overall, hence little we could say would in any way influence their attitude nor overcome the fact that "A.R." is now increased in price.

The "Ross Hull" V.h.f. Contest rules again appear to have drawn their share of attention and many vocal persons can be heard voicing their disapproval of the current rules. If you are dissatisfied then you should put your views to your Division or write to "A.R." Once other Amateurs have heard of or read your ideas on the new rules you suggest, the consensus can be forwarded to the Contest Committee for action. The time to protest is now. Little point is to be gained by commenting upon what the rules should be, when the Contest is on. Your committee is prepared to open correspondence upon this matter and to forward the final results to the Contest Committee, or you may act direct. The important thing is to have the rules ready for submission well in advance of the **next** contest.

The new "Call Book" is ready, but there could be some delays in the Interstate deliveries due to the holiday period slowing down normal mail. You can purchase your copy from the W.I.A. or Booksellers, as soon as they have received supplies.

Please remember that the February issue of "A.R." will not include **any** notes. This is caused by annual holidays at the Printers, and the standard format will again appear in March, 1965, "A.R.," copy for which is due by the 8th February at P.O. Box 36, East Melbourne, C.2, Vic.

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NEW CALL SIGNS

SEPTEMBER, 1964

VK2ANS—J. J. Lilley, C/o. O.T.C., Bringelly.
VK2ASK—C. Harte, 144 Carlton Pde., Allawah.
VK2AYE—G. E. McPhee, 19 Borambil Place, Oyster Bay.
VK2BHA—1st North Strathfield Boy Scouts, N.S.W. Assoc., Central Park, Welbank St., North Strathfield.
VK2BJH—J. E. Hillman, 770 King Georges Rd., Penshurst.
VK2BKS—Kyogle Scout Radio Club, Station: Scouts Hall, Wiangaree St., Kyogle; Postal: C/o. R. Wilson, Borabee St., Kyogle.
VK2BRF—O. R. French, 78 Hercules St., Dulwich Hill.
VK2BRR—R. J. Richards, 49 Ourimbah Rd., Mosman.
VK2BWS—M. W. J. Sheldon, 40 Highlands Ave., East Gordon.
VK2ZDI—D. W. Rickard (Portable), C/o. Flat 340/3P, Dewrang Ave., Woomera.
VK2ZGO—G. K. Oates, 12 Smith Ave., North Manly.
VK2ZSJ—J. S. Michell, 18 McEvoy St., Padstow.
VK2ZWK—W. E. Kelly, 34 Sailors Bay Rd., Northbridge.
VK3CJ—C. J. Manning, 8 Monaco Cres., Beaumaris.
VK3DP—F. C. Duffin, 23 Shelbourne Court, Mornington.
VK3KI—T. P. Kirby, 17 Edinburgh Rd., Blackburn South.
VK3ADA—A. D. Proudfoot, 5 Andrew St., Horsham.
VK3AFW—R. R. Cook, Flat 5, 3 Gordon Gr., South Yarra.
VK3AIG—Gordon Radio Society, Fenwick St., Geelong.
VK3ATO—L. Grimshaw, 70 Emma St., Carrum.
VK3ZDG—K. C. Trevarthen, 28 Malcolm St., Blackburn.
VK3ZGQ—D. K. W. Bradbury, 7 Tarata Drive, Doveton.
VK3ZRP—R. A. Philp, 12 Lodden St., Box Hill.
VK4PE—Padua College Radio Club, Turner Rd., Kedron.
VK4PZ—P. E. Wilkins, 90 Brisbane Corso, Fairfield.
VK4YB—G. Bahre, 633 Oxley Ave., Scarborough.
VK4ZRA—H. J. Crosthwaite, 61 Phillips St., Deagon.
VK5CP—A. R. Jarman, 35 White St., Henley Beach.
VK6BC—P. I. Buzzard, 56 Moulden Ave., Yokine.
VK6GP—R. G. Price, 144 Robert St., Como.
VK6XW—K. Henning, 4 Butler St., Narrogin.
VK6ZES—S. J. Sands, Port Hotel, Carnarvon.
VK7BH—B. N. Hall, 49 Bastick St., Rosny.
VK7CR—C. Russell-Green, 99 Marlyn St., South Hobart.
VK7TA—B. L. Jones, 2 Richmond Pde., Sandy Bay.
VK7ZGP—G. P. Power, 10 Belle Vue Ave., Launceston.
VK7ZNS—N. Stutterd, 24 Moore St., Wynyard.

FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

FEDERAL

I.T.U. FUND

As agreed at the last two Federal Conventions, Divisions were given target figures to meet towards financing representation at forthcoming I.T.U. Conferences. To date, the percentage of the target figures met are shown by States:—

VK2	—
VK3	25%
VK4	47%
VK5	32%
VK6	75%
VK7	50%

The above figures represent monies received by Federal Executive and not necessarily monies still held by Divisions.

MEMBERSHIP RETURNS

All Divisional Secretaries or Membership Secretaries are reminded that membership returns on Federal Form A are to be forwarded to Executive as at the first of each month. It is essential that Executive obtains figures from ALL Divisions. It is especially necessary at this time of the year as per capita payments for the Convention and other expenses are based on them. Your co-operation would be appreciated.

AMENDMENT TO NATIONAL FIELD DAY CONTEST

Delete Rule 8 and substitute the following:— "8. The following shall constitute Call Areas: VK1, VK2, VK3, VK4, VK5, VK6, VK7, VK8, VK9 and VK0."

FEDERAL CONSTITUTION ALTERATIONS

The proposal to make amendments to the Federal Constitution 1947, as notified in the January and February issues (1964) are still under discussion as several comments have been received. Advice of any changes will be notified in this column as soon as these are resolved.

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FEDERAL QSL BUREAU

DL4IO writes: "Since leaving Africa one year ago, and ending our long operations of EL4A and EL4YL, we have had no way to receive the many late QSL cards sent us since we left. Present QTH is Mr. and Mrs. Ken Bale, DL4IO, 7100 Heilbronn/Bockingen, Haagstr 18, Federal Republic of Germany."

The K.A.R.L. advise that the present number of HM stations is HM1 37, HM2 6, HM3 2, HM5 6, HM8 6, HM9 2, and HM0 1. Total of 60 stations.

Details of the 8th OK DX Contest, scheduled for Dec. 6, 1964, again arrived too late for prior publication. Details re logs may be had from this Bureau.

Norm Koch, K6ZDL, 17204 Eastwood Ave., Torrance, Calif., U.S.A., advises he is now QSL Manager for HM1AP/HM9AP. Norm states that the old QSL Manager was injured in a cycling accident and broke her back! S.a.s.e. is required for QSLs.

—Ray Jones, VK3RJ, Manager.

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FEDERAL AWARDS

The following Awards have been issued during 1964:—

W.A.V.K.C.A. (Nos. 252 to 265): UA4IF, VR1G, UA0EH, W0AUB, JA2AB, DL1IA, K6CT, VE4OX, W5UX, W6KG, K4TWK, KR6OF, W6PHF, W9UZS.

SILENT KEY

It is with deep regret that we record the passing of:—

VK3KR—Ken Rankin.

W.A.S. 50 Mc. as follows:—

Call	Cert. No.	Addt. Cntr.	Call	Cert. No.	Addt. Cntr.
VK4ZAA	45	-	VK4ZAL	58	3
VK2ABR	46	4	VK8ZCX	59	-
VK6ZAA	47	-	VK6ZDS	60	1
VK2ZCF	48	2	VK5KK	61	3
VK4ZLG	49	2	VK6ZAS	62	-
VK2ASZ	50	2	VK5ZGF	63	3
VK3ZGP	51	1	VK5WV	64	1
VK5ZSG	52	-	VK6BE	65	4
VK6ZCM	53	-	VK7ZAP	66	2
VK3ZIG	54	1	VK5ZEJ	67	2
VK4ZK	55	3	VK3WK	68	2
VK4ZEK	56	1	VK6ZCX	69	1
VK1VP	57	2	VK4ZGL	70	4

V.H.F.C.C. as follows:

Call	Cert. No.	Confirmed 144 Mc.	Confirmed 50 Mc.
VK5KK	28	—	143
VK1VP	29	—	100
VK4ZAL	30	—	100
VK2ASZ	31	—	100
VK4ZLG	32	—	100
VK6ZDS	33	—	108

D.X.C.C. New Members:

	Cert. No.	Call	Countries
Phone	64	VK2APK	128
C.w.	79	VK3AHQ	248
C.w.	80	VK5KO	102
Open	94	VK3ACD	104

—Alf Kissick, VK3KB, Awards Officer.

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NEW SOUTH WALES

HUNTER BRANCH

With the holiday season upon us, many of the local members are using their surplus spare time to prepare the gear for the VK2 Convention to be held in Sydney over the January long week-end. Perhaps this year we may even see some activity on mobile in the neglected bands of 160 and 10 metres. The top-band finds great favour with the boys in G land for local mobile working and 10 metres is used for this type of working in U.S.A. Both these bands seem to offer something to those who have mediocre results on 40 metres. And if you are not contemplating mobile operation, then why not join the growing ranks of the home station boys who are using top-band with outstanding results for cross-town contacts. It seems very important to "use the bands or lose them" as the war cry of the I.T.U. representatives has been and the only way to fulfil this worthy aim is to get on the air as often as possible and use ALL the bands. Those ethical sounding remarks made by some delegates at the recent Asian Broadcasting Union Conference were interpreted by some to mean even greater piracy by commercial stations on exclusive Amateur bands, especially 40 metres. Just listen any afternoon, or any part of the day for that matter, and you will realise the impossible situation which is developing too rapidly for comfort.

Mac 2ZMO is in the market for some very special high melting point lubricant since the bearings on the 6 mx beam became overheated while feverishly working the excellent DX heard of late on this band. Bill 2XT, fresh from his oriental perambulations, has found the same happy position prevails enabling him to keep in contact with many of his JA friends. After a break of two weeks or so to look through his coin collection for rare items, Gordon 2ZSG is now putting the finishing touches to the newly elevated shack amid the ecclesiastical surroundings of Marine View. On the other side of the town is the sloping wire belonging to Stan 2AYL who now gets remarkable results on Top Band with the "Topsy" tx. Two metres was never like this —according to Stan.

A local radio retailer just happened to have a hundred or so old steam radios for disposal so who should appear but Joe 2ANL. Armed with a sturdy vehicle, they were all taken to the school and the boys, their urge for demolition satisfied, given the job of stripping and classifying. As a result, Piux X radio club now has a truly remarkable array of most useful items for use in projects. The novelty of the new Morse Trainer at Westlakes Radio Club has now passed and the boys are using the unit to good effect. So confident are they, following its use, that three at least intend taking the examiners on at the January quiz for Amateur Operators. It is to be hoped that the paper does not contain too many of the professional type questions which have been all too frequent in recent months. Could it be that an attempt is being made to discourage rather than encourage? That long hoped for technician class licence is long overdue. Club leaders will support me, I am sure, when I say that experience on equipment works wonders with understanding theory.

Three more local boys have been accepted as Associate members of the Division. They are Les Field, Norm Sweetman and John Richards. There are terrible things happening in the coaly city of Cessnock. Peter 2AIY rose very early the other morning and decided to indulge in an unsupervised round of golf before breakfast. Carefully taking in tow the golf buggy, he crept stealthily out of the house leaving the sleeping occupants within. His delight turned to anguish however when he looked around just as he was leaving the gate to find that it was not the golf buggy at all, but the lawnmower! That shows he should have stuck to Amateur Radio and left that evil Scottish game alone. In the same vicinity lives Sherwood who, when asked what his call was, had to consult the Call Book—it's just so long since he's been on the air! The rest of the Cessnock boys are keeping the metropolis on the map with activity from the Radio Club. Being next to the baths, it is easy to get a good reflecting earth for the aerial farm.

Jan 2BJO has been notified of his appointment to Singleton and, as luck would have it, is domiciled only 200 yards from Geoff 2VU. Does the man on the air first have the right of way? Bill 2ZL is secretly preparing for operation on Top Band. He has been heard asking for crystals on the very frequencies most popularly in use. When the winter returns he will stoke up the fire and get the Phenyle Bay Railway in service once more. Paddy's fame has spread as far as VK3 anyway and to prove it, 3BA visited Toronto a few weeks back just to inspect the 2AXU venetian blind dipole. Al still wonders why it works. If you listen round the bands after you read this, you will no doubt hear some of those who from their labours, of the past year, deservedly rest. Varley 2SF, Jim 2AHT, Harold 2AHA and Stuart 2AYF have all promised increased activity when the holidays come, so look out for them.

I hope members will not forget that there is no meeting during January. The next meeting, which probably will be in the same location as last year's, will be held on Friday, 5th February. More details will be given in broadcasts from 2AWX in the coming weeks. The committee has lined up some quite outstanding lectures for this year and it is hoped that attendances at meetings will be better than ever. Remember, it's good to be alive in 1965! See you then, 73, 2AKX.

BLUE MOUNTAINS SECTION FIELD DAY

The Blue Mountains Section Annual Field Day, held at the new venue, Glenbrook Park, on 15th Nov., was well attended. Present were the usual gang from the Bathurst Radio Club, Major 2RU and Les 2RJ, complete with XYLs from Gosford and Newcastle respectively, plus a good roll up from Sydney and surrounds. The weather as usual was excellent and families enjoyed the outing.

The first field event was a mobile scramble on the way to the Park. Dave 2AWZ and Bob 2ASZ tied with 19 contacts for first place in the v.h.f. section, while Major 2RU was a clear winner in the h.f. section.

The "snifter" hunt created considerable interest, the tx was located within the Park. For quite a period competitors wandered around more or less aimlessly until some clues indicated that the tx was not on any fixed object and was close to the ground. It was one of the more adventuresome types—Harold 2AAH—who selected a lady from the crowd and proceeded to investigate. Bob 2ASZ's mother-in-law, complete with dipole across the shoulders and tx in a handbag, provided the missing signal. Dick 2ZCF was close at hand for second place.

In the afternoon session the ladies and children left by bus for a tour of Warragamba Dam, while the OMs searched for a hidden 144 Mc. tx. Dave 2AWZ and John 2ANF were the only team to pick the right ridge and find the unit hidden by Bob 2ASZ.

The final events were the v.h.f. and h.f. scrambles run simultaneously. Nev 2DR won the v.h.f. section and Dave 2AWZ the 7 Mc. event.

There were the usual lucky numbers for XYLs and OMs and the prize presentation was in the capable hands of State President, Vic 2VL, and Section Chairman, 2ASZ.

Thanks are extended to Ducon Condensers Pty. Ltd. and to the Miniwatt Division of Philips Industries for the donation of prizes and technical data, and to the A. W. Valve Co. for data folders.

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VICTORIA

WESTERN ZONE

With seasonal work being what it is in a predominantly rural zone, shearing and harvest for some and a different "harvest" for such as Bert 3EF, Merve 3AFO away having a look at t.v. from the tx and your scribe's lack of activity due to trouble with that strange beast "the donk," newsgathering becomes something of a hit and miss affair.

Ray 3ATN's proposed antenna system for the Moonbounce project created a lot of interest and will be a real showplece in an already impressive antenna farm. Herb 3NN's activity on 432 Mc. indicates the future of v.h.f. in the far wet assured. Neil 3AQD's recently purchased 30 ft. tower delivered, but apparently felled while still growing because when approached with tape to determine vital statistics was found to be over 40 ft. Also in the picture concerning towers is Harry 3ZX who "inherited" one from Mac 3AZM who is moving to a new QTH. A very nice a.m. signal from Mac's little emergency service rig. Why bother rejoining the sideband brigade now that you have discovered the ultimate medium Mac?

With the approach of the fire season, Smoke Net operators are chasing the spiders out of emergency equipment, replacing borrowed components and generally gearing for the anxious months ahead. A possible exception is Alan 3HL who states that his gear must work, it was OK last summer. It was last summer that this rig refused to load the wrong aerial.

Bill 3AKW and Trev. 3ATR would seem to be riding the airwaves more than they are disturbing them, an interest which has captured quite a few Hams of late.

Barry 5YB and Rodger 5NY were heard on the hook-up battling severe QRN. Keep it up boys, conditions must improve. The "donk" just stopped, the thing only keeps active with repeated "kicks in the ribs"—a most tiring business, but we will soon have it soft, easy and comfortable. Happy new year to all. 73 David 3ADS.

OBITUARY

K. R. RANKIN VK3KR

The VK3 Division of the Wireless Institute of Australia announces with sincere regret the sudden passing of Ken Rankin, VK3KR, on 8th November last.

Ken received his licence and commenced operation in August 1926. His first contact was with Chas. Baker, VK3VP, on 13th August, 1926, using the 180 metre band. Ken joined the R.A.A.F. Wireless Reserve and was one of the first to enlist at the outbreak of war. He rose to the rank of Warrant Officer, serving in the Pacific and other theatres of war from 1939 to 1945.

After discharge he moved to Benalla with his wife and family and became manager of the Regal Theatre and later the Drive-In Theatre.

Ken played a major role in setting up the radio communications network of the Benalla and District Rural Fire Brigades' Group 12 years ago. His work in the initial stages created great interest among neighbouring bush fire brigades and set the pattern in some areas outside Benalla district for an efficient radio communications system.

Although in ill health for some months, Ken appeared to be well on the way to complete recovery and maintained his Amateur Radio activity. In fact his final QSO was only about an hour before he passed away.

To his sorrowing wife, daughter and son we extend our heartful sympathy in their sudden and sad loss.

SOUTH WESTERN ZONE

Firstly I would like to wish all members a Happy and Prosperous 1965 and plenty of DX.

Don 3AKN has been very active on the v.h.f. bands, having contacted the following stations: Eric 3ZL, of Ballarat, who has a nice s.s.b. rig going well; Thorb 3APS, at Casterton, who has taken up farming as an extra hobby; Ron 3ZER, of Ballarat; 3ZDM, 3ZJD, 3NM, 3ZKW, 3ZNJ, 3ZOO, 3ZOR, 3ZCE, 3ZDM, and Dave 3ZJU, of Hamilton, who is quite active. Don also attended the annual dinner last year and congratulates all who had anything to do with its organising.

Pat 3ADN, of Lismore, is very busily engaged in Fire Net work as he is the President of the R.F.B.A.; congrats. Pat on the good work. Peter 3FX has moved to a new QTH and hopes to be back on the air soon. I believe Wal 3QI passed through our city recently. Hope he will call again some time and make his presence known. We always like to meet any of the radio fraternity.

3WB was doing a fine job with the Scouts Jamboree-on-the-Air as he had a lot of Scouts with him working portable at Mt. Napier. 3TW was also on for the Jamboree. Bob 3IC, of Geelong, was out with the Geelong Radio Club station 3ATL, complete with Scouts; congrats. Bob for this great job. 3AAW, Y.M.C.A. Radio Club, Warrnambool, also took part with Second Warrnambool Scouts with Peter Kearney, Patrol Leader of Platypus Patrol, as their spokesman.

We have another new Amateur to welcome to the Zone. Neville 3AAQ is associated with the National t.v. station at Ararat. He is also a mate of Neil 3AQD. Let's hope that tx loaded up all right chaps. Alan 3BA, at Beaufort, hasn't been heard on the air for some time; can't you find the switch Alan or has the horror box got you in its grip? Don 3AKN also reported that Neil 3HG has been heard on the air again after a long illness. This is very nice to hear as Neil was always very active on Sunday mornings, along with Jack 3JA. These boys always had a regular sked, so hope to hear more of you chaps. James 3MC was included in this sked quite regularly.

Reg 3APR has come on now and again, keep it up Reg as we must get some regular activity into the Zone. John 3ARJ comes on each Thursday night for the Zone hook-ups, along with Harry 3AXI, but over the last few months not much support has been given to the hook-up each Thursday night, so what about it chaps.

Bill 3XE is flying and hopes to have his wings shortly. Believe he is rather good at following railway lines, but after a while they disappear. Bill 3WK is also flying, so it looks as though we will have plenty of flying Amateurs in the Zone. Don 3AKN's XYL has had her wings for some time, congrats. Peg. Norm 3EQ is on 21 regularly and has a few JA QSOs and also comes on 80 quite often. Ted 3PS has retired from work after 50 years in business in Warrnambool as a jeweller. He should have plenty of time now to get back on the air. The next Zone Convention is to be held in Ballarat, I believe. If the boys up there can't manage it, it looks like coming back to Warrnambool. 73, Bill Wines.

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SOUTH AUSTRALIA

The monthly general meeting of the VK5 Division for November took the form of the Xmas Social, and a very representative gathering was present. Strangely enough, early in the evening the attendance figures did not look too hopeful, but just before starting time all the seating accommodation was filled and standing room only was the order for the rest of the night.

Usually for this annual event, the entertainment for the night takes the form of a film evening, but this year an extravaganza to end all extravaganzas was presented, to wit, a demonstration of multiple tape recording, with Dave 5DS acting as recording engineer, musician, compere, comedian and when he was not

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R.," in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.

busy, he shoved a broom up his jumper and rushed around the room sweeping up the floor! To say that the demonstration by Dave was an eye-opener would be to make the understatement of the year, and I think it can be safely said that both from a technical and an entertainment point of view, he laid them in the aisles. The members lapped up the technical side of the entertainment, and their XYLs lapped up the entertainment side of the technical points. Suffice to say that Dave is now the hero of the Division, and the pin-up boy of the XYLs, to say nothing of the boost he has received to his technical prestige.

The vote of thanks to Dave for his efforts was ably proposed by my favourite banker, Keith 5KH, and the applause in support from those present should have boosted Dave's ego no end. All jokes aside, it was a splendid effort on his part and only goes to show just how much ability lies dormant within the Division and only occasionally sees the light of day. Nice work, Dave, you sure rocked them.

There was a goodly sprinkling of the ladies present, which is all to the good, and they seemed to spend a very congenial evening mixing, eating and talking after Dave had finished. The evening concluded at the witching hour of 11 p.m., with everybody having thoroughly enjoyed themselves to the full.

Bill 5HR, who has been little heard of in recent times, was among those present, as was Joe 5JO and Mrs. Joe, to say nothing of many other celebrities, the names of whom escaped the memory of my espionage agent planted in the audience. Yes, you have guessed it, I missed the night, the first time for far more years than I care to remember, but duty called and after all I must eat. What's that? Why must I eat? Well, you have got something there!

The truth is out. Leith 5LG has been holidaying, as has Buck 5DA, hence the silence from Leith. It was not the aftermath of the chewed up cable after all.

Bob 5DO is due to move to Christies Beach in the new year, or so he was heard telling Joe 5JO at the station of the Brompton Boys' Club (5BA) the other night.

Len 5ZF is apparently a serious contender for the next Field Day honours. He has nine antennae erected and hopes to work all bands, although whether this means multi-operator effort, or that he has an octopus in training, I am at the moment not too sure. Anyway, he means business. That nine aerials sounds more like the "Umbrella Man," Jim 5JK of old, does it not?

The VK5 W.I.C.E.N. group had a very successful simulated exercise this month in conjunction with the Emergency Fire Service and the St. John Ambulance Brigade at the Mount Barker Oval. Although starting off on the wrong leg with the 53 Mc. base and mobile becoming temperamental, the gang soon became re-organised and from then on everything went with a swing. The Co-ordinator, John 5JC, was more than happy with the whole show, and the reaction from the outside was good. As is usual with the local press, no mention was made of W.I.C.E.N. in the write-up next day, but as long as those responsible were appreciative, then I suppose that is as much as we can expect from the outside world. More of this type of exercise for the W.I.C.E.N. group should prove a shot in the arm to all concerned, to say nothing of the experience gained.

Brian 5BI heard on 7 Mc. portable from Cowell in QSO with Keith 5TJ from Clare. Both signals coming in down here at great strength, and both sides appeared to be enjoying themselves.

Clem 5WG was another one to be heard on 7 Mc. with an outstanding signal. He was talking about going bush next day, but I did not stay long enough with his contact to find out just what that statement meant.

Heard the usual network hard at it on 7 Mc. the other evening. Reg 3MZ, Carl 5SS and Frank 5MZ. Going on the conversation, it would appear that Carl was the only one in any condition of health. Frank and Reg both on sick leave—Reg with a nasty sounding finger injury, Frank with symptoms unknown. Anyway, their injuries or complaints did not seem to have any effect on their usual good humour and leg pulling, but I did think that Frank seemed a little subdued. All OK now chaps?

Our worthy President, Phil 5NN, is having quite a lot to say on the habits of our local motor car drivers these days. He was on his way to work the other morning when a car in front of him stopped at the scene of an accident. Phil, did likewise, when without any warning shout of "give way"—"make way" —or even "Tom Way"—the car behind him gave him a gentle nudge—so gentle that Phil gave the car in front a gentle nudge as well. With Phil as the meat in the sandwich—and what a vocal piece of meat—things were quite hectic for a short while, and with damage to the tune of 70 fiddely dids or so, Phil wended his merry way down the Belair hill. Perhaps the word merry is a little out of place, but then we must keep up the image of our President—who would want to know that he spent all of his time on the way to work talking to himself!

Tom 5TL sent me a couple of letters last month and I had the audacity to tell him that I had not received them after a couple of days had passed by. Have you ever told a tea drinker that his Department has not delivered a letter? Well take my advice and don't!! When I finally broke down and confessed that I had not been out to my letter box for a couple of days and therefore had not picked the letters up, I got the impression that he was about to have a couple of inverse convulsions in series-para-phrased module. I think he accepted my apologies, although the noise he made in reply could have meant anything. However, he did say goodnight to me.

Talking of the Department—although why anyone would want to talk of the Department —another tea drinker in Arch 5XK came up for air recently and gave me a ring (on the telephone of course), but I was absent at the time. This of course did not deter Arch, who apparently spent the next hour or so talking to my XYL who gave a ready ear to all the untruths and coarse remarks that he was only too willing to tell her about me. However, he did extend an invitation to us both to drop in for a cup of the proverbial tea should we be passing, and I am somewhat tempted to avail myself of the offer. After all, there must be something in this tea racket!

Received a copy of the Port Pirie Recorder the other day with Amateur Radio being given the pride and place on the front page. It appears that local t.v. reception had been on the blink (no pun intended!) at Port Pirie and of course the Amateur copped the lot. The headlines stated—and I quote: "Secret enquiries into Local T.v. Reception. Hams say they are in the clear . . . Because of complaints of Ham Radio broadcasts allegedly interfering with t.v. reception in Port Pirie, members of the Port Pirie Amateur Radio Club conducted secret tests last week in an endeavour to locate unauthorised operators. Each licensed operator had his set sealed voluntarily during the period of the investigation which lasted a full week . . . According to the club the test proved that licensed Amateur operators were not responsible for excessive t.v. reception interference . . . All transmitters were sealed by the Deputy Town Clerk, Mr. R. Mudge." The front page of the "Recorder" was taken up by this and a lot more of what Ye Ed is fond of calling padding when applied to me, but all in all it would appear that the local club members had stood up on their hind legs and barked with good effect. Good work, but only time will tell if the scoffers and doubters are convinced. Thank you to the anonymous poster of the paper, perhaps not as anonymous as they would wish, and I will send the front page on to the magazine who perhaps will see that F.E. eventually receive it. By the way, I tried to get some reference to the matter in the local paper here, but as we don't live in a fringe area for t.v., the matter did not register.

Jim 5JK called in the other day to see me but again I was absent in the line of duty. My XYL tells me that his daughter is to be married in the New Year, and that Jim is a busy little bee. She did not say what sort of a "B". He is another one who has been on the sick list, but is now on the mend again.

I have been listening on 7 Mc. each afternoon lately in the chance that I might pick up some news of the doings of the locals, but all to no effect. I could always count on this band for a little gossip, distorted or otherwise, but even the regulars seem to have given the game away. I do seem to be able to hear plenty of VK3s and VK2s, but they never seem to gossip!

With news on the home front again scarce this month, I am up to my tricks of last month and brazenly pinching news from the latest issue of "Info," that well-put-together and welcome journal of the Elizabeth Amateur Radio Club, for which I humbly apologise and hasten to express my heartfelt thanks. Any actions, court or otherwise, to be addressed to the W.I.A., G.P.O. Box 1234K.

Les 5AX has temporarily abandoned v.h.f. to exploit his recently acquired transceiver on the square bands. Incidentally, the Gawler Scout Group has started a youth radio group and has taken out a licence 5BP. I assume under the guidance of Les, and is appealing for the necessary to start a junk box. What about it, chaps?

Brian 5ZBR is busy these days scaring the daylights out of Elizabeth gentry with transmitters by taping all and sundry with his new tape recorder. One must be careful just what one says on the air these days, must not one?

Don 5TM has bobbed up on 6 metres once again for his annual quota of DX.

Keith 5ZMK has been conspicuous by his absence, due possibly to the fact of the arrival of a new harmonic—a bonny bouncing boy. Congrats. go to Rosie and Keith, with particular emphasis on the brave front exhibited by the father. There is no doubt about it chaps, we fathers have a lot to battle for, it always amazes me how we ever pluck up courage to have the second youngster!!

Rumour has it that Brian 5ZNK and Bill 5WV are contemplating operation on 52 Mc. this Xmas. Father Xmas have anything to do with this?

From the DX column in this same journal I glean the snippet that Bill (ex 5BS) is now stationed at Singapore and operating with the call sign of GM4GZ until he gets his own call.

Still talking of "Info," I strongly recommend the Editorial of the latest issue on the I.T.U. Fund. This is well put together, sensible, and a both-sided approach to the question; a little unusual in that so far all writings on the subject in the magazine and Divisional journals assume that there are not two sides to the subject. I think the closing paragraph sums up the subject very well, and I quote: "Perhaps it is not much good buying a new tube only to have to use it in the family radiogram. We should, however, consider other aspects of this representation before sending our money the same way as the last lot went." The editorial refers in the main of course to the latest issue of the VK5 Journal.

Frank 5FA, of Oodnadatta—that Frank is a shot in the dark, but if I am not right, plenty will let me know—who has not been on the air since pre-war, has been bitten by the bug again and is more than interested. He previously held the calls of 5FB and then 4DZ.

My spies tell me that Arch 5XK has been receiving one or two letters from DX-land asking him if he is going to have another DX-pedition this year. These enquiries are because about this time for the past couple of years he has DX-peditated to Norfolk Island, much to the satisfaction of the Ws and other interested key thumpers. My theory is that the flesh is willing but the pocket is weak—am I right Arch?

My gentle admonition to Mr. Wilson (4RW) —we are still not on christian names standing— regarding his trying to put himself in for a "cuppa" with the girls from VK2, certainly brought in its wake a lot of flattering remarks as to my chance of ever getting invited to join the girls in a tea drinking session. One character was even heard to remark that if I cared to drop in at his QTH any time, my dainty hands would surely be holding a cup, but the cup would not be holding tea! Nice of him, was it not? Anyway, when I summed up the total of flattering remarks I began to wonder if I had allowed my natural modesty and reserve, to say nothing of my old-world gallantry, to get somewhat out of hand, and that I had over-estimated my fatal attraction for the opposite sex. Just as my confidence had reached rock bottom, who should I spy galloping over the moat toward my drawbridge, none other than a telegram boy. With thoughts that Mr. Adams of VK3 fame had at last decided to recognise my humble efforts toward keeping his empire going, I rushed to the door to take delivery and found to my surprise and gratification that it was even something better. I quote: "Your dainty hand will surely hold the cup"—signed Verle 2MR. I shall be at home to greet the queue of scoffers and unbelievers who will surely be along to humbly apologise for their lack of appreciation. My sincere thanks Verle, for your kind invitation, but not a word to Bessie! Incidentally, my XYL is living in hopes that some gentle reader will send her a telegram or letter expressing sympathy for her in her being tied for life to a conceited windbag. Flattery—flattery—that is all I seem to get. Fat chance she has got of ever receiving a communication along such misleading lines! Oh, by the way, the telegram was addressed to Pansy Parsons, a fact which seemed to cause the telegram boy considerable amusement.

Have heard a lot about street lamps that replay B.B.C. music, of electric toasters that give out Morse signals, and even of gas stoves that at times play excerpts from the A.B.C., but it was only this month that I heard of a water tank that tapped and thumped in rhythm to a commercial broadcasting station musical efforts. The discoverer of this mystery was none other than Bob 5BG, and after intense research and a little bad language, a large goanna was found half way in the down-pipe of the tank at his work, merrily threshing his tail, more often than not in tune to the music from the monitor speaker. Science fiction at its best, eh Bob?

Some are born to fame, some have fame thrust upon them, others are just famous. It must be marvellous to be famous and so well

known that when a fellow Ham rings up and asks for Mr. Ovaltine, the said fellow Ham is automatically connected to Mr. Haseldine (5JC). True as true!

The V.h.f. Picnic, held this month at "Walnut Paddock," in National Park, was the social event of the month and resulted in the roll-up of a keen and happy group of Radio Amateurs and their families, all of whom thoroughly enjoyed themselves. The weather on the morning of the Picnic did not give any encouragement to those intending to venture into the hills, but by the afternoon it had turned out quite a fair day, and aside from the high wind, conditions were ideal. There were three well contested competitions, more than a fair share of goodies, ice cream, soft drinks, etc., quite a number of harmonics falling in and out of the creek (much to their enjoyment and their parents' annoyance), to say nothing of a chance of enjoying a real good old chinwag on matters Radio, and last but by no means least, a chance to relax in congenial company with common interests. Although it was named a V.h.f. Picnic, members of the square bands turned up in force, Council being particularly well represented—the President (Phil 5NN) and the Vice-President (Ross 5KF) being among those present—and all in all, the day was more than a success and something of an indication to Council that an annual picnic is good public relations for members. To those responsible for the arrangements, a hearty pat on the back, your efforts were well rewarded, keep up the good work.

I note with dismay, and a feeling of hurt, that in one of the contests at the Picnic—the one in which names of important people in Amateur Radio were included for solution—the name of Pansy was not included, although it was said that the picture of the elephant gave several people ideas!!

Well, this is the end of another year, and I feel the end of a very successful year for the VK5 Division. May I extend to my one reader of these notes the compliment of wishing him, or perhaps it is a her, anyway, whoever it may be, all the best for the New Year. Do your little bit for our grand old hobby, no matter how small. And always remember, you only get back from a hobby just as much as you put into it! 73, 5PS—PanSy to you—especially to you Verle 2MR!!!!

— . . . —

WESTERN AUSTRALIA

The meeting for October was very well attended and during the night some lively discussions took place. One of our members had a grievance and brought it along and aired his feelings. This is as it should be as then your Council has a chance of doing something about it. If you don't let them know your feelings, they cannot help you. So what about it?

After some discussion on a motion to increase the subs. by 5/- per year, it was put to the vote and was carried unanimously. This means that as from the beginning of the financial year you will have to pay an additional 5/-. If you stop and look at this rise you will realise that it is only small and the first rise which has taken place for a large number of years.

From around the country we have been able to gather some items of interest. Katanning, Herb 6XO has obtained a new sideband tx and you can certainly tell the difference when you hear him on the air. From Katanning also we hear that George 6XG has something new but alas, it is not radio wise but in fact something which may keep him off the air. How about drilling some holes in it to mount some mobile gear, George. I am sure that no one would object to this! Still from the country, we hear about an active Amateur from Donnybrook who has purchased himself a fishing rod. Jack, I understand that you intend using this for its original application and not to repair your Quad. Good fishing, Jack, but take along some portable gear for when the fish are not biting.

Moving along to Bunbury we hear that Ted 6JG is going to the Eastern States and is going to bring back some commercial sideband equipment. Good going, Ted, and you certainly deserve it. Swinging back to Narrogin, Pat 6PH seems to be very much alive and more active since his stay in hospital, what was that theme song they played for you Pat?

Then we move up to the metro. area and we find that 6DP was very occupied on the night of the Council meeting. Of course we should not have held the meeting on People's Day of the Royal Show, Tom, but what was she really like? Our President Vic 6VK is at present expanding his knowledge and we wish him well with his studies. Rolo 6BO has been away up north with his caravan and although he has taken gear with him, I have not heard him on. Probably he has been on and I have not been around.

The results of the 80 mx scramble were: 6WL won the fixed station section and 6KN won the portable section.

The W.I.C.E.N. f.m. units have all been placed now and you can hear a lot of chaps using this gear if you care to switch on. I am not sure of the exact number of units, but it is somewhere around 20.

This Division's quota for the I.T.U. Fund was £225 and although you may have seen printed that we have only paid a small percentage of this the figure published is not correct. In fact we have sent to Federal Treasurer an amount of £219/19/0, so you can see that we are well up on our figure.

This seems to be all for now, so don't forget that I want information to publish and your Council wants to hear your complaints as well as your suggestions. 73, Roy 6RY.

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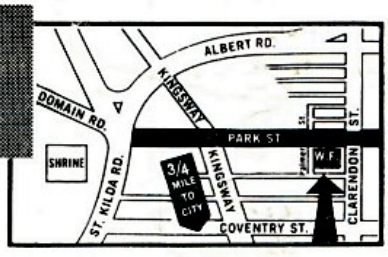

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